Bulletin of the *Transilvania* University of Braşov
Series IX: Sciences of Human Kinetics • Vol. 17(66) No. 2 – 2024
https://doi.org/10.31926/but.shk.2024.17.66.2.13

DEVELOPMENT OF EXPLOSIVE STRENGTH IN THE REPRESENTATIVE HIGH SCHOOL VOLLEYBALL TEAM

E.L. AMZĂR [1] L. RADA [1] I.I. NICULESCU[1]

Abstract: *The physical education teacher has the obligation to form the representative team of the school unit to be enrolled in the competition provided in the sports calendar, respectively the National School Sports Olympiad.*
The aim is to educate all students in sports according to their skills, material basis, sports tradition of the educational unit, in order to lay the foundation for the creating the habit of systematic practice of some sports branches, namely the game of volleyball. Motor skills are absolutely necessary for a total participation of the student in all phases of attack and defense. Among these, the value of the motor quality, force, depends on the degree of training and applied efforts, efforts that must be large enough to lead to the development of the student's moto qualities. Starting from the knowledge of morpho - functional peculiarities specific to the post-pubertal age, a pattern can be structured to identify the optimal solutions for the development of explosive force by general means but also specific to the game of volleyball. The efficiency and diversification strategies of stimulation and development of explosive force in volleyball play involve valuing the theoretical and practical knowledge and experience of the specialist, whose ultimate goal is to discover and capitalize the motor potential of high school students in order to achieve performance in school competitions.

Key words**:** *volleyball, representative school team, high school cycle, explosive force.*

1. Introduction

Physical Education at the high school level confers students' numerous opportunities. P.E. represents the main motor activity, accessible to everyone. Along with physical development, it contributes to the maintenance of the health estate in ontogenesis, bringing a type of knowledge and understanding based on rules, raising awareness among students related to its social value.

[1] Faculty of Science, Physical Education and Informatics, Department of Physical Education and Sport, National University of Science and Technology Polytechnics of Bucharest - University Center Pitesti, Romania.

The post-pubertal school age represents an increased interest, according to many authors, which, by its involvement in various physical education activities, is characterized as a flexible receptive age for the instructional-formative process [13, 14, 15].

Many specialists, such as Colibaba-Evuleţ D. [5, p.78], Bota C. [3, p. 43], Epuran M. [8, p.123], Marolicaru M. [10, p.7], Păcuraru A. [12, p.36], highlight the advantages of sports games, especially of volleyball practiced by a large number of young high school students, as well as equal engagement of both sexes in motor activities carried out in various conditions, the effect being the achievement of motor and sportive performances.

Specialized literature offers us a lot of means and methods to optimize the physical education lesson regarding the development of motor qualities and the formation/ improvement of motor skills, and, consequently many authors consider that, when practicing the volleyball game, the predominant driving quality is speed with its forms of manifestation, such as: simple and complex motor reaction, complex, speed of execution and drifting. Similarly, it determines the manifestation of the dynamic force that is necessary when practicing volleyball, which makes this sport accessible through the variety of means and exercises that determine an optimal development of the targeted motor capacities [1], [3], [5, 6, 7], [9], [11]. These qualities can be measured in control tests, such as: speed feet running on 20m, standing long jump and standing vertical jump and with takeoff, or other samples.

The game of volleyball is a sports discipline characterized by dynamism that involves repeated jumps with maximal and submaximal effort, followed by short periods of rest. Thus, the volleyball player is obliged to perform repeated maximum efforts (during the blocking or attacking shot), over a period of time of about 90 minutes and even more.

2. Research and Hypothesis

2.1. The purpose of the research: resides in the development of a sports training program at the level of the representative volleyball team in the high school cycle, and by using appropriate methods and means to contribute to the efficient increase of training and implicitly to the achievement of sports performances in competitions.

2.2. The objective of the research:

1. Scientific documentation by studying specialized literature aimed at the development of explosive force in volleyball.
2. Establishing the structure and content (strategies) of the sports training program of the volleyball team at the level of the high school cycle.
3. Experimental validation of sports training program for the volleyball team at high school.

2.3. Hypothesis:

It was assumed that by identifying and applying the most effective means of explosive force development in accordance to the age and training characteristics of the students, within the representative high school volleyball team, will contribute to increasing the level of physical and technical training of the team having the premise of obtaining superior results in competitions.

2.4. Research methods:

In order to carry out the research that we proposed, namely the efficiency of the sports training of the volleyball team at the high school level, the following research methods were applied: the method of studying the specialized literature, the method of the pedagogical experiment, the method of pedagogical observation, the processing method and data interpretation through the method of recording and statistical-mathematical processing of the data obtained through the experiment, the graphic and tabular method. In order to proceed to the hereby research, the following tests were used to measure and evaluate the explosive force: the standing long jump, the Squat Jump and the standing vertical jump without taking off.

2.5. The research organizing:

The research was carried out in the year 2022-2023 and aimed to find the most effective means for training the representative school volleyball team. There were 2 training sessions per week for 120 min.

2.6. The subjects of the research:

The subjects of the research are the members of the representative volleyball team, students aged 14-18 years, a team composed of 12 players, from the Theoretical High School in Costești.

Table 1

Means used for the development of explosive force in the representative school team- V

Crt. No.	***Exercise Description***	***Doses***	***Methodical indications***
1	Jumps over small fences using both legs. The student executes jumps on both legs over small fences that are 30 cm high, on a 4 m distance.	3 series;	The student has to approach the right position when jumping over the fences: • Keep his arms around his body, bent from the knee; • When taking off, student needs to keep his feet on top; • Make use of his / her arms;
2	Jumps over small fences using just one leg. The student executes jumps over 8 small fences, 30 cm high.	3 series with the right leg and other 3 series with the left leg.	• There should be a good arm – leg coordination; • When jumping, the student's foot should be on top; • Correct and precise movements during the execution are regarded; • The jump over the fence should be as high as possible;
3	Jumps over obstacles, small circles, small ladders, no supplementary tasks;	8 jumps x 2 series, active break: 1'.	• The contact with the ground should always be on the top of the foot;
4	Jumps including lots of leaps at various heights (jumps over obstacles – fences, cones);	9 jumps x 2 series, active break: 1'.	The student shall execute jumps using both feet over the fence. He/ She should pull his knees to his chest, keep his back straight and arms bent from the elbow articulation.

Crt. No.	***Exercise Description***	***Doses***	***Methodical indications***
5	Semi squats and jump;	8 repetitions x 4 series	• The vertical jump be as high as possible; • Elbows and knees be a bit bent; • Student needs to have a flexed position, with arms bent;
6	Jumps from one foot to another, bench supported.	20 jumps x 3 series	• Pull his legs powerfully; • Contact with the ground be on top of the foot; • Student shall help himself with the arms.

3. Analysis and Interpretation of the Research Results

Table 2

Statistical - mathematical indicators regarding the standing long jump - initial test - final test

INITIAL TEST	
Statistical indicator	Standing long jump
Average	2,235
Standard deviation	0,098298
Variability coefficient	4,398122
FINAL TEST	
Statistical indicator	Standing long jump
Average	2,27875
Standard deviation	0,081308
Variability coefficient	3,568082

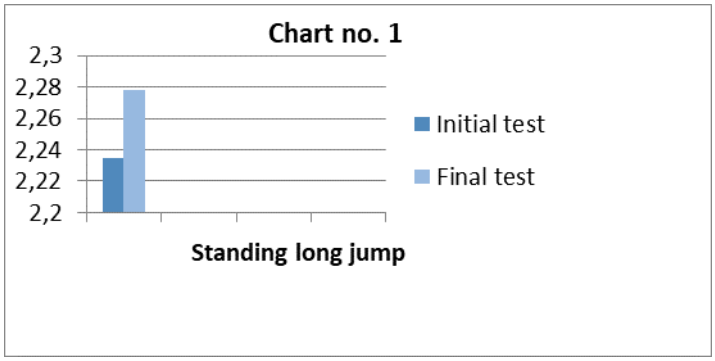

Fig. 1. *Standing long jump*

According to the registered values, the parameter for the distribution curve of the standing long jump was positive, as follows:

- $\bar{x}$ initial = 2,235 (initial test);
- $\bar{x}$ final = 2,278 (final test)

Table 3

Statistical - mathematical indicators regarding the Squat jump - initial test- final test

INITIAL TEST	
Statistical indicator	Squat Jump Test
Average	33,625
Standard deviation	3,018174
Variability coefficient	8,975983
FINAL TEST	
Statistical indicator	Squat Jump Test
Average	35,4375
Standard deviation	2,849753
Variability coefficient	8,475103

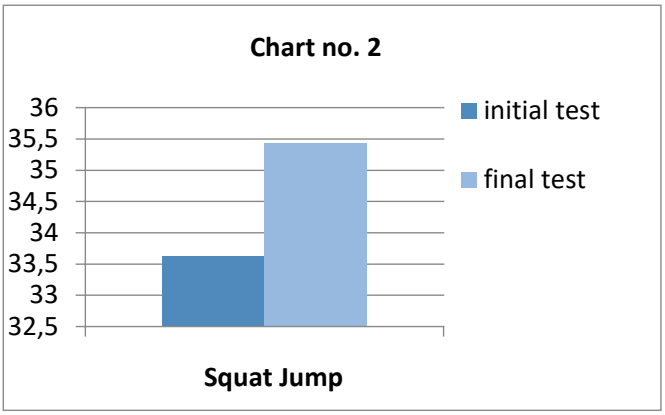

Fig. 2. *Squat Jump*

Two evaluations were carried out during the experiment, moderated values and average values were recorded, namely:

- $\bar{x}$ initial = 33,625 (initial test);
- $\bar{x}$ final = 35,4375 (final test);

We can see that the difference between the initial and final testing is 1.8125, which proves that there have been improvements regarding this parameter.

Table 4

Statistical - mathematical indicators regarding the standing detent test - initial test - final test

INITIAL TEST	
Statistical indicator	Standing detent test
Average	37,9375
Standard deviation	2,925507
Variability coefficient	7,711387
FINAL TEST	
Statistical indicator	Standing detent test
Average	39,75
Standard deviation	2,989565
Variability coefficient	7,359767

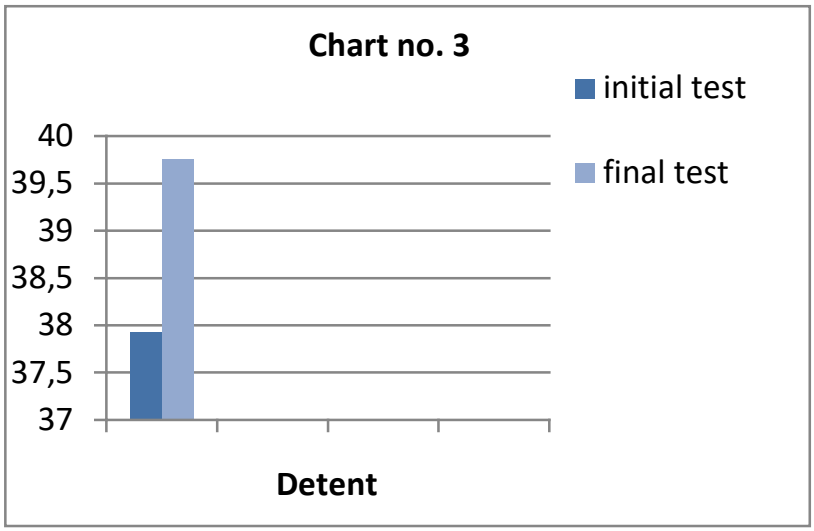

Fig. 3. *Detent*

Standing detent

Two evaluations were carried out during the experiment. Thus, the shape of the distribution curve of the "Standing detent" test was ascending and average values were obtained (ti-39), respectively:

- $\bar{x}$ initial = 37,93 (initial test);
- $\bar{x}$ final = 39,75 (final test);

We can see that the difference between the initial and final testing is 1.82, which proves that the training carried out shows improvements in terms of this motor test.

4. Conclusions

1. In the framework of physical training, an important role is played by strength training, which has the role of enhancing sports performance, its benefits being multiple: it is the component that contributes to the evolution and improvement of the game, obtaining the sports form and establishing it during the competitive period, injury prevention, rapid recovery after trauma, player training, safety in performing game tasks.
2. The way in which strength training is approached within the physical training of a team directly influences the level of technical and tactical behavior, contributing at the same time to the improvement of the body's major functions and morpho-functional indices, establishing conditioning relationships between them and the other sides of the preparation.
3. The application of the selected means had positive effects, which confirms the progress of the final testing, indicating superior values compared to the initial testing.

References

1. Bădău, D., Paraschiv, F.: *Sports games, theory and methodology.* Brașov, Transilvania University of Brașov, 2007, p.25-45.
2. Bădău, D.: *Relationship between space orientation and manual laterality*. In: The annals of "Lower Danube" University of Galați, Fascicle XV, 2011, no.2, p.12-15.
3. Bota, C., Predescu, B.: *Physiology of physical education and sport* – Ergophysiology. București, "Antim Ivireanul" Publishing House, 1997, p.150-319.
4. Cojocaru, A., Ioniță, M.: *Volleyball-book of practical works*. București, Romania of Tomorrow, 2005.
5. Colibaba-Evuleț, D., Bota, I.: *Sports games. Theory and methodology*. București, Aladin Publising House, 1998. 327p.
6. Croitoru, D.: *Ambidexterity in sports games.* București, ANEFS, 1999, p.32-57.
7. Dina G. *Notebook of practical works. M.D.S.- Sports games. Volley-ball*. București, UNEFS, 2009.
8. Dragnea, A., Bota, A.: *Theory of motor activities.* București, Didactic and Pedagogical Publishing House, 1999. 282 p.
9. Epuran, M.: *Psychology of physical education and sport.* București, Romania of Tomorrow, 1995, 198 p.
10. Fântâneanu, E.: *Volei. Little encyclopedia*. București, Sport - Tourism, 1981, p.5-18.
11. Marolicaru, M.: *Differentiated treatment in physical education*. București, Sport Turism, 1986, p.7-14.
12. *** Ministry of Education, Research, Youth and Sports. National Curriculum Council. *Methodological guide for the application of the physical education and sports program in high school education*. Bucharest, Aramis Print, 2000.
13. Păcuraru, A., Balaiș F., Prisecaru G. *Methodical priorities in the training of*

children and juniors in volleyball. In: Sport and Society, no. 1, 2000, p. 36-40

14. Rîşneac, B., Voiculescu, C.: *General considerations on the psycho-pedagogical aspect in sport.* In: Materials of the International Scientific Conference, USEFS, Chisinau, 2000, p. 58-69.
15. Verza, E.: *Ego and personality*. București, Scientific and Encyclopedic, 1997, p. 32-49.