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# STUDY REGARDING THE EFFICIENCY OF DYNAMIC GAMES IN LEARNING VOLLEYBALL AT PRIMARY SCHOOL LEVEL

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**Abstract:** Our study focused on the importance of using dynamic games on learning basic technical elements in volleyball and their influence on anthropometric development in children. The research had two groups of pupils, the first - the experimental group consisted of 20 pupils aged between 10 and 12, 12 boys and 8 girls, a group with which we worked alongside the 2 hours of physical education in the program with an additional 3 hours of volleyball training; the second group - the control group, consisting of 20 pupils aged between 10 and 12, 13 boys and 7 girls, a group with which we followed the classical curriculum.
The methods used in the research were: method of study of specialized literature, observation method, experiment method (anthropometry and technical tests), mathematical method, graphic method.
The results showed significant differences in anthropometric development between the two samples as well as important differences in the acquisition of technical elements in the volleyball game.
The findings of the study showed that the dynamic games used and the playful agonist program utilized in the experimental group had efficiency both on the physical development and in particular on the learning of the basic technical elements of the volleyball game.

**Key words:** anthropometric development, dynamic games, volleyball.

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## INTRODUCTION

Volleyball is a team sports game that has spread very rapidly on all continents since its appearance. In our country, volleyball game is divided in both mass and performance competitions. Practiced at all levels of education as a means of physical education - its systematization is included in the content of physical education programs - volleyball meets

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training requirements, helping to improve general physical education indexes for pupils and students (Pomohaci & Sopa, 2015).

The use of dynamic games and programs of competitive exercises for learning the basic technical elements in volleyball has emerged from the need to use, especially in the first period, means to attract children to the training process and through which to make lessons as pleasant, interesting and varied as possible.

It is well known that, in the process of training in its various stages, it is feasible to use the dynamic games, relay races, and the preparatory games that solicited the children on multilateral levels (physical, technical, psychic), providing them with satisfactions they can not find in the first years of volleyball.

The games and the relay races used in our research contained simple and correct elements allowing as to make as many repetitions as possible and to maximize team spirit. In the physical education lesson at the level of primary school, these means of training can take different places depending on the age or the training period. In the present case, the beginners included as lesson themes or training themes.

In choosing dynamic and preparatory games, we took into account the number of participants, the material available, and the technical possibilities of the pupils to solve the gameplay correctly.The importance given to physical activity has declined over the last ten years (Burgeson et al., 2000) so our study focuses on the importance of physical activity in developing skills and living a healthy life at children through volleyball game means. Also, another scientist approves the decline of participation in sports activities stating that there has also been a decrease in the physical compatibility of the youngsters (O'Malley et al., 2007).

The development of skills and technique is significant in initiation in any sports games. Also, technique development relies on the effectiveness of individual and team actions. (Shaao & Balan, 2012). So coaches or teachers should pay particular attention to technical aspects, particularly, during the learning stage (Niculescu, 2002).

Also, the development of skills acquired through motor learning which leads to the organization of certain behavior until they become automatically acquired (Orţănescu, 2001) and relies on practice. To perform better in volleyball game aerobic and anaerobic capacities must be developed because this game requires fast and hard movements (Tsunawake et al., 2003). Moreover, besides those skills volleyball game being an interval game consisting of short-term loading and resting in consecutive phases require high muscle strength and skill (Abreu et al., 2003).

Children spend much time in the school programs in developing skills and knowledge, one of this programs is physical education and sports class that should significantly contribute to their physical and mental development (Johnston et al., 2007). The physical development and health gained during childhood can maintain throughout life by participating in the kind of activities, also being essential for the body to function at the optimum level (Baltaci, 2008).

Related to physical education and its effects on group cohesion experts say the following: physical education can also improve the cohesion of groups, having a good cohesion of the group is considered important and may lead to better performance of the group. (Sopa & Pomohaci, 2016).

Regarding selection for a volleyball game, some authors stated a strong selection to a volleyball team, skill development, but not endurance-type fitness evaluation, help predict selection to the higher or lower group (Gabbett & Georgieff, 2007; Gabbett et al., 2007). A commonly used method to accomplish skill development as well as improve conditioning level is skills-based development also known as games-based conditioning (Trajkovic et al., 2016). Specialists confirm that having a good leader can improve the performance of any team, so many studies focused on finding the right leader the volleyball team (Sopa & Pomohaci, 2015). It well

documented that skills learned under fixed and blocked conditions (i.e., repetitive performance of the same skill in the same terms before progressing to the next skill) result in greater short-term improvements in performance. (Magill, 2001; Porter et al., 2007; Brady, 2012). However, when tested following a period of non-training, subjects who learned under random and variable conditions (i.e., frequently performing different skills under variable conditions) demonstrated greater retention of skill, indicating greater long-term learning.

Assessing individual players during practice provides coaches with the information they need to make lineups, see the attack directions in practice, do special exercises for the attack directions of his own team, or even with basic information such as positive or negative attack points that each player has (Szabo & Sopa, 2015).

Studies have assessed the specificity of skill-based conditioning games in a limited number of team sports (e.g., football, rugby) Gabbet (2008) discovered that sports games that base themselves on skills and have pronounced physiological demands regarding competition at the junior level in volleyball game can offer a specific stimulus. Researchers Gabbett et al. (2006) came to the conclusion that training programs in volleyball game can develop speed, agility, spiking, passing, setting and have some effectes in physiological and anthropometric development of players.

Young players often find it hard to support the traditional fitness training, because of a lack of enjoyment and experience with this type of exercise (Wall & Côt, 2007).

At the moment, in training process, a complex game like drills and previous games require participation, and the close cooperation of more players or the whole team respectively are preferred. Drills conducted in this way have complex character stimuli, which lead to an increase in effectiveness and game like situations' solution stability and which can also contribute to fitness development and maintenance (Lehnert et al., 2008).

Some important situational factors of team cohesion are living with or near each other, sharing hobbies and activities, similar uniforms and clothing, rituals of the group, etc. Then, as personal factors we can say that commitment and satisfaction, leadership factors and a democratic style of leadership also can help in raising team cohesion (Sopa & Szabo, 2015).

Some studies showed significant improvements in physical fitness with the game-based training of short duration (Impellizzeri et al., 2006), while others have found improvements in physical qualities when using longer duration games (Gabbett, 2006).

Some studies have compared the effectiveness of the traditional technique approach and the game-based instructional model on game performance in school settings (Kirk & MacPhail, 2002). Gabbet (2008) discovered that games that are conditioned by skill development can also stimulate physiological and psychological the players by its specific stimulus offered by training programs in the junior elite volleyball competitions.

**SCOPE**

The purpose of this study was to identify the influences and effects of active games on the learning of technical elements in the volleyball game.

**OBJECTIVES**

The main aim of this paper is to present the core elements of the volleyball game, acquired through preparatory methods through dynamic games adapted to the beginners of the primary education. The purpose of our experiment is to check the effectiveness of the various exercises and previous games on the acquisition of essential elements in volleyball.

## HYPOTHESIS

Using dynamic games in learning the technical elements of the volleyball game can have beneficial effects on students' volleyball performance and physical development indices.

## MATERIALS AND METHODS

The methods used in the present study were the following: observation method, specialty bibliography study method, graphic method, mathematical method and experimental method.

## SAMPLE OF RESEARCH

The sample of the research consisted of two groups: the first group was the experimental group consisting of 20 pupils aged between 10 and 12, 12 boys and 8 girls; and the second group, the control group, composed of 20 pupils aged between 10 and 12, 13 boys and 7 girls. Within the experimental group, we run a volleyball initiation program, adjacent to the 2 hours of physical education and sport, 3 training sessions and participating in numerous school competitions (Table 1). The control group followed the structure of the classical physical education and sports curriculum.

**Table 1.** Distribution of student samples of the research

| Group of students | The age of the students | Gender | | The program with which we worked |
|---|---|---|---|---|
| | | Male | Female | |
| Experiment group | 10 ± 2.4 years old | 12 | 8 | A work program that added 3 additional trainings which had included in preponderant learning volleyball technical structures through dynamic games |
| Control group | 10 ± 2.1 years old | 13 | 7 | Classical program: 2 hours of physical education and sport, following the classical school curriculum |

## RESULTS

The study was carried out between 01.09.2016-26.07.2017 on two samples of pupils from the same school, Gymnasium School Nr. 179, Sector 1, Bucharest. In the experiment, we performed two tests (Initial Testing in September-October 2016 and Final Testing in June-July 2017). We used two types of tests, an anthropometric test in which we measured the following indicators: height, weight, bust, wing span, superior member length, inferior member length, bi-acromial diameter, bithrohanterian diameter and thoracic perimeter. The second type of test targeted the technical part of the volleyball game and tested 4 parameters: overhand passing, underhand passing, receiving the ball from the other side of the net to the setter, and service.
The results of the initial and final anthropometric measurements in the experimental group and the control group were as follows (Table 2 and Table 3):

**Table 2**. – Anthropometric measurements in the Experimental group – Initial test

| Statistic indicators | Height | Weight | Torso | Wing span | LSM | LIM | D.Bia | D.Bit | TP |
|---|---|---|---|---|---|---|---|---|---|
| **X** | 132.28 | 31.80 | 69.44 | 129.16 | 50.08 | 64.92 | 26.60 | 28.24 | 69.28 |
| **$M_e$** | 132.00 | 31.00 | 69.00 | 128.00 | 49.00 | 65.00 | 27.00 | 28.00 | 69.00 |
| **$M_o$** | 130.00 | 29.00 | 68.00 | 128.00 | 49.00 | 65.00 | 27.00 | 26.00 | 69.00 |
| **$A_s$** | 3.94 | 4.13 | 2.86 | 5.23 | 2.52 | 3.68 | 2.10 | 2.30 | 2.69 |
| **Var** | 15.54 | 17.08 | 8.17 | 27.31 | 6.33 | 13.58 | 4.42 | 5.27 | 7.21 |
| **$A_m$** | 13.00 | 14.00 | 10.00 | 18.00 | 8.00 | 15.00 | 8.00 | 8.00 | 9.00 |
| **Min** | 127.00 | 27.00 | 65.00 | 122.00 | 46.00 | 58.00 | 23.00 | 25.00 | 65.00 |
| **Max** | 140.00 | 41.00 | 75.00 | 140.00 | 54.00 | 73.00 | 31.00 | 33.00 | 74.00 |
| **$C_v$** | 0.03 | 0.13 | 0.04 | 0.04 | 0.05 | 0.06 | 0.08 | 0.08 | 0.04 |
| **Skewness** | 0.82 | 0.86 | 0.45 | 1.02 | 0.18 | 0.60 | 0.20 | 0.51 | 0.43 |
| **Kurtosis** | -0.42 | -0.20 | -0.78 | 0.11 | -1.22 | 0.57 | -0.28 | -0.71 | -0.47 |

**Table 3** – Anthropometric measurements in the Control group – Initial test

| Statistic indicators | Height | Weight | Torso | Wing span | LSM | LIM | D.Bia | D.Bit | TP |
|---|---|---|---|---|---|---|---|---|---|
| **X** | 130.56 | 32.08 | 68.24 | 127.36 | 49.36 | 63.84 | 26.84 | 28.04 | 68.12 |
| **$M_e$** | 130.00 | 31.00 | 68.00 | 127.00 | 50.00 | 63.00 | 26.00 | 27.00 | 68.00 |
| **$M_o$** | 130.00 | 30.00 | 68.00 | 122.00 | 50.00 | 63.00 | 24.00 | 26.00 | 65.00 |
| **$A_s$** | 3.69 | 4.45 | 2.82 | 5.27 | 3.25 | 3.57 | 2.62 | 2.84 | 2.37 |
| **Var** | 13.59 | 19.83 | 7.94 | 27.74 | 10.57 | 12.72 | 6.89 | 8.04 | 5.61 |
| **$A_m$** | 12.00 | 16.00 | 10.00 | 17.00 | 11.00 | 14.00 | 9.00 | 9.00 | 7.00 |
| **Min** | 125.00 | 26.00 | 64.00 | 120.00 | 45.00 | 56.00 | 23.00 | 24.00 | 65.00 |
| **Max** | 137.00 | 42.00 | 74.00 | 137.00 | 56.00 | 70.00 | 32.00 | 33.00 | 72.00 |
| **$C_v$** | 0.03 | 0.14 | 0.04 | 0.04 | 0.07 | 0.06 | 0.10 | 0.10 | 0.03 |
| **Skewness** | 0.27 | 0.94 | 0.44 | 0.42 | 0.27 | 0.09 | 0.43 | 0.52 | 0.17 |
| **Kurtosis** | -1.06 | 0.39 | -0.37 | -0.76 | -0.74 | -0.10 | -1.00 | -1.02 | -1.25 |

PT – Thoracic perimeter
LSM – Length of the superior members
LIM – Length of the inferior members
D.Bia – Biacromial diameter
$M_e$ – Median
$M_o$ – Module
X – Arithmetic mean
$A_s$ – Standard deviation
Var – Variation
Am – Amplitude
Min – Minimum value
Max – Maximum value
$C_v$ – Coefficient of variability
D.Bit – Bitrohanterian diameter

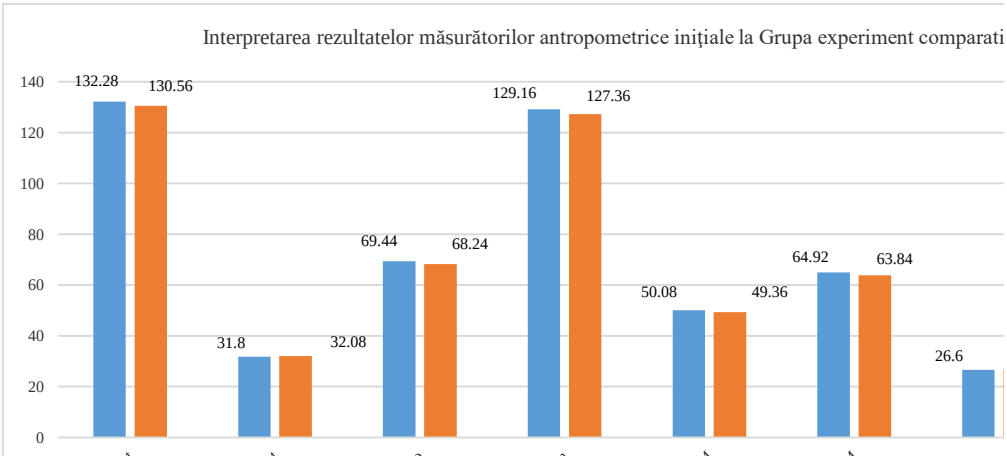


**Figure 1** – The interpretation of the anthropometric measurements at the Experiment group compared with the Control group – Initial test

In the original motor evaluation, we can see the differences between the experimental group and the control group (Figure 1). So, taking it point by point, we can see for the "height" parameter, in the experimental group, we have an average of 132.28 cm, with an increase of 1.7 cm compared with the control group that has an average of 130.56 cm. At the "weight" parameter we found that the control group, with a mean of 32.08 kg, had an increase of 0.28 kg compared to the experimental group, with an average of 31.80 kg. Within the "bust" index, we find a difference of 1.18 cm between the experiment group averages, 69.44 cm, and the control group averages with 68.24 cm.

In the case of the "wing span" index, we found a difference of 1.8 cm between the experimental group, with an average of 129.16 cm, and the control group, with an average of 127.36 cm. At the "length of the superior members" index, we recorded a difference of 0.72 cm, between the experimental group, with an average of 50.08 cm, and the control group with a mean of 49.36 cm. Concerning the "length of the inferior" index, we found a difference of 1.08 cm, between the experimental group, with an average of 64.92 cm, and the control group, with a mean of 63.84 cm.

The "biacromial diameter" index showed a 0.24 cm difference in favor of the control group, averaging 26.84 cm, compared to the experiment group, averaging 26.60 cm. Measurement of the "bitrochanterian diameter" showed a difference of 0.20 cm between the experimental group, with a mean of 28.24 cm, compared to the control group, with an average of 28.04 cm.
For the "thoracic perimeter" index, we find a difference of 0.16 cm between the experiment group average (69.28 cm) and the control group mean (68.12 cm).

**Table 4**. – Anthropometric measurements in the Experimental group – Final test

| Statistic indicators | Height | Weight | Torso | Wing span | LSM | LIM | D.Bia | D.Bit | TP |
|---|---|---|---|---|---|---|---|---|---|
| **X** | 133.32 | 32.60 | 70.52 | 130.60 | 51.28 | 66.36 | 27.76 | 29.00 | 70.20 |
| **$M_e$** | 132.00 | 32.00 | 70.00 | 129.00 | 50.00 | 66.00 | 28.00 | 29.00 | 70.00 |
| **$M_o$** | 130.00 | 30.00 | 69.00 | 129.00 | 50.00 | 66.00 | 28.00 | 27.00 | 70.00 |
| **$A_s$** | 4.05 | 4.07 | 2.89 | 5.12 | 2.54 | 3.35 | 2.11 | 2.06 | 2.69 |
| **Var** | 16.39 | 16.58 | 8.34 | 26.17 | 6.46 | 11.24 | 4.44 | 4.25 | 7.25 |
| **$A_m$** | 14.00 | 16.00 | 10.00 | 17.00 | 8.00 | 14.00 | 8.00 | 7.00 | 9.00 |
| **Min** | 128.00 | 26.00 | 66.00 | 125.00 | 47.00 | 60.00 | 24.00 | 26.00 | 66.00 |
| **Max** | 142.00 | 42.00 | 76.00 | 142.00 | 55.00 | 74.00 | 32.00 | 33.00 | 75.00 |
| **$C_v$** | -129.27 | -28.53 | -67.6 | -125.4 | -48.7 | -63.0 | -25.6 | -26.9 | -67.5 |
| **Skewness** | 0.89 | 0.68 | 0.32 | 1.14 | 0.22 | 0.77 | 0.05 | 0.50 | 0.31 |
| **Kurtosis** | -0.09 | -0.17 | -0.82 | 0.24 | -1.21 | 0.93 | -0.72 | -0.62 | -0.54 |

**Table 5.** – Anthropometric measurements in the Control group – Final test

| Statistic indicators | Height | Weight | Torso | Wing span | LSM | LIM | D.Bia | D.Bit | TP |
|---|---|---|---|---|---|---|---|---|---|
| **X** | 131.36 | 34.00 | 69.08 | 128.16 | 50.16 | 64.72 | 27.68 | 28.72 | 69.00 |
| **$M_e$** | 131.00 | 34.00 | 69.00 | 127.00 | 50.00 | 64.00 | 27.00 | 28.00 | 69.00 |
| **$M_o$** | 129.00 | 35.00 | 68.00 | 127.00 | 47.00 | 64.00 | 25.00 | 27.00 | 68.00 |
| **$A_s$** | 3.50 | 4.40 | 2.69 | 4.98 | 3.16 | 3.53 | 2.25 | 2.51 | 2.18 |
| **Var** | 12.24 | 19.33 | 7.24 | 24.81 | 9.97 | 12.46 | 5.06 | 6.29 | 4.75 |
| **$A_m$** | 12.00 | 16.00 | 10.00 | 16.00 | 11.00 | 15.00 | 7.00 | 8.00 | 7.00 |
| **Min** | 125.00 | 28.00 | 64.00 | 121.00 | 45.00 | 57.00 | 25.00 | 25.00 | 66.00 |
| **Max** | 137.00 | 44.00 | 74.00 | 137.00 | 56.00 | 72.00 | 32.00 | 33.00 | 73.00 |
| **$C_v$** | -127.86 | -29.60 | -66.3 | -123.1 | -47.0 | -61.1 | -25.4 | -26.2 | -66.8 |
| **Skewness** | 0.17 | 0.89 | 0.16 | 0.38 | 0.07 | 0.23 | 0.44 | 0.53 | 0.10 |
| **Kurtosis** | -0.83 | 0.74 | -0.52 | -0.93 | -0.94 | 0.20 | -1.11 | -0.90 | -1.09 |

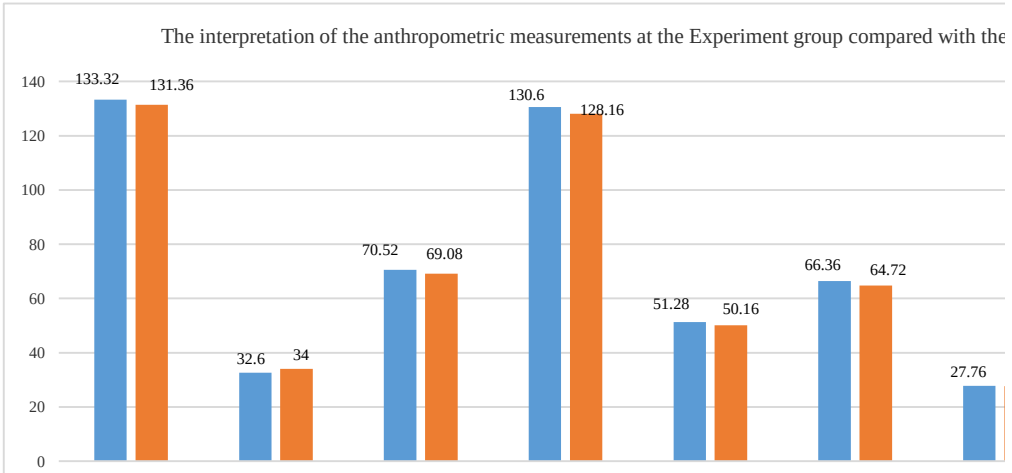


**Figure 2**. – The interpretation of the anthropometric measurements at the Experiment group compared with the Control group – Final test

In the final motor evaluation (Table 4 and Table 5), we can see the differences between the experimental group and the control group (Figure 2). So, taking it point by point, in the case of the "height" parameter we can see that the experimental group with an average of 133.32 cm has an increase of 1.91 cm from the control group, with an average of 131.36 cm. At the "weight" parameter we found that the control group, with an average of 34 kg, had a 1.4 kg addition to the experimental group, with an average of 32.6 kg. Within the "bust" index, we find a 1.44 cm difference between the experiment group averages of 70.52 cm and the control group averages of 69.08 cm.

In the case of the "wing span" index, we found a difference of 2.44 cm between the experimental group, with an average of 130.6 cm, and the control group, with an average of 128.16 cm. In the "length of the superior members" index, we recorded a difference of 1.12 cm, between the experimental group, with an average of 51.28 cm, and the control group with a mean of 50.16 cm. Concerning the "length of the inferior members" index, we found a difference of 1.64 cm between the experimental group, with an average of 66.36 cm, and the control group, with an average of 64.72 cm.

The "bi-acromial diameter" index showed a difference of 0.08 cm in favor of the control group averaging 27.76 cm, compared to the experimental group, with a mean of 27.68 cm. Measurement of the "bitrohanterian diameter" showed a difference of 0.28 cm between the experimental group, with an average of 29 cm, compared with the control group, with a mean of 28.72 cm. For the "thoracic perimeter" index, we find a difference of 1.20 cm between the experiment group average (70.20 cm) and the control group mean (69 cm).

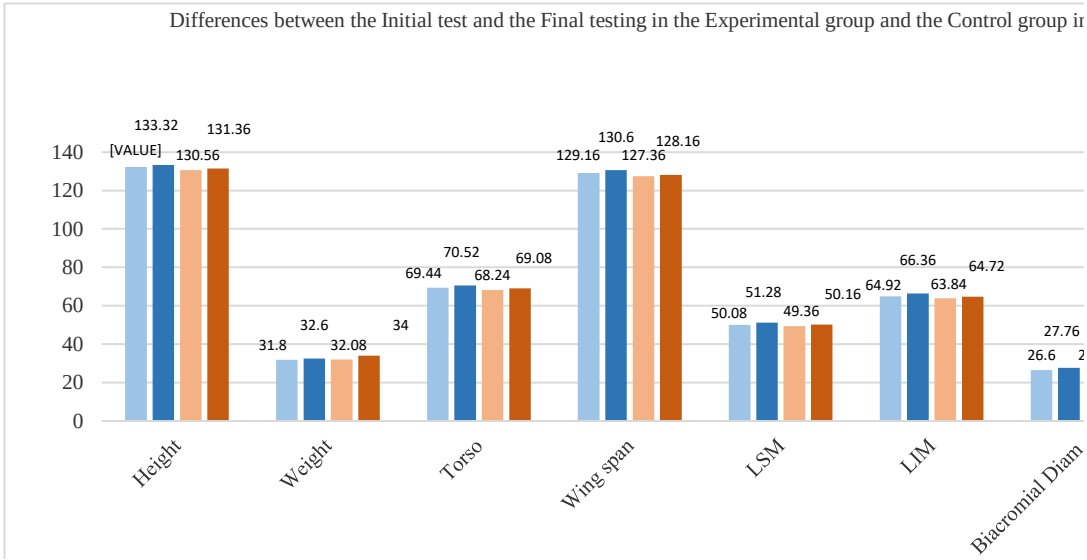


**Figure 3.** – Differences between the Initial test and the Final testing in the Experimental group and the Control group in anthropometric examination

Analyzing the anthropometric differences between the initial and final tests in the two groups, experiment, and control (Figure 3), we can observe the following:

- for the "height" parameter in the experimental group, there was an increase of 1.04 cm, representing a growth rate of 0.78%, superior to the control group where we recorded an increase of 0.80 cm, representing a growth rate of 0.61%; applying the T significance test we observed that

the value of t was -1.744999 and p of 0.093779, p >0.05, indicating an insignificant difference between the two groups of students.

- for the "weight" index, we recorded a higher increase in the control group of 1.92 kg, representing a growth rate of 5.99% compared to the experimental group which recorded an increase of 0.80 kg, representing a growth rate of 2.52%; applying the T significance test we observed that the value of t was 1.14210 and p of 0.262198, p >0.05, indicating an insignificant difference between the two groups of students.

- in the "torso" index, we recorded a higher increase in the experimental group of 1.08 cm, representing a rate of progress of 1.56% compared to the control group which recorded an increase of 0.84 cm, representing a progress rate of 1.23%; By applying the T significance test, we noticed that the value of t was -1.685085 and p of 0.104933, p >0.05, indicating an insignificant difference between the two groups of students.

- at the "wing span" index, there was a 1.44 cm increase in the experimental group, representing a 1.11% improvement rate, superior to the control group which recorded an increase of 0.80 cm and a speed of progression of 0.63%; applying the T significance test we observed that the value of t was -1.665254 and p of 0.108864, p >0.05, indicating an insignificant difference between the two groups of students.

- in the "length of the superior members" index in the experimental group, we recorded a 1.20 cm increase, representing a 2.40% improvement rate, superior to the control group, which increased by 0.80 cm and a growth rate of 1.62%; by applying the T significance test, we noticed that the value of t was -1.360469 and p of 0.186323, p >0.05, indicating an insignificant difference between the two groups of students.

- regarding the "length of the inferior members" index, we recorded a 1.44 cm increase in the experimental group, representing a 2.22% improvement rate, superior to the control group that recorded an increase of 0.88 cm, representing a progress rate of 1.38%; by applying the T significance test, we noticed that the value of t was -1.674167, and of p of 0.107082, p >0.05, indicating an insignificant difference between the two groups of students.

- within the "bi-acromial diameter" index, we recorded a 1.16 cm increase, representing a progress rate of 4.36%, in the experimental group, superior to the control group, which recorded an increase of 0.84 cm, representing a progress rate of 3.13%; applying the T significance test we observed that the value of t was -0.131567 and p of 0.896424, p >0.05, indicating an insignificant difference between the two groups of students.

- at the "bitrohanterian diameter" index, we observed an increase of 0.76 cm within the experimental group, representing a progress rate of 2.69%, superior to the control group which recorded an increase of 0.68 cm, representing a rate of achievement of 2.43%; by applying the T significance test, we noticed that the value of t was -0.449281 and p of 0.65726, p >0.05, indicating an insignificant difference between the two groups of students.

- for the "thoracic perimeter" index, we recorded a 0.92 cm increase in the experimental group, representing a 1.33% improvement rate, superior to the control group that recorded an increase of 0.88 cm, representing a progress rate of 1.29%; applying the T significance test, we noticed that the value of t was -1.584812 and p of 0.126099, p >0.05, which indicates an insignificant difference between the two groups of students.

The results of the final technical tests in the experimental group and the control group were as follows (Table 6 and Table 7):

Description of technical tests:

- overhand pass to the wall: the student is facing a smooth wall at a distance of 2 m. We noted the number of consecutive reps that the student managed to do without the ball to touch the floor or catch the ball. Two attempts were made, taking note of the test with the highest number of repetitions.

- overhand pass with a partner: the student chooses from the group a colleague with whom to pass and sit face to face at a distance of 3 m from each other. The two players do overhand pass without the ball falling on the floor or being caught in hands. Note the number of consecutive passes that the two students succeed in doing in two attempts.

- underhand pass to the wall: the same pattern as the last test different being that the ball is underhand pass to the wall, the difference made by the method of bouncing the ball with two hands under.

- underhand pass with your partner: follow the same pattern as the overhand pass.

- receiving the ball toss by the evaluator to the setter: the student positioned in the 6 zone in the receiving position; in zone 2 is another pupil that play as a setter. The evaluator tosses the ball into the opposing area. The student in zone 6 performs receiving, sending the ball to the setter. We note how many receivings reach the setter. The test was performed twice, and the best performance of the student is noted.

- service: The student is at the edge of the volleyball court with the ball in his hands, he takes 10 underhand services. We note how many services are performed correctly over the volleyball net and in the opponent's playing court.

**Table 6**. – Testing the students from the experiment group at the tehnic test in volleyball game

| Technical tests | Overhand pass to the wall | Overhand pass with partner | Underhand pass to the wall | Underhand pass with partner | Receiving the ball and send it to the setter | Service |
|---|---|---|---|---|---|---|
| **X** | 43.08 | 38.12 | 33.16 | 28.24 | 7.04 | 7.92 |
| **$M_e$** | 44.00 | 39.00 | 33.00 | 28.00 | 7.00 | 8.00 |
| **$M_o$** | 44.00 | 39.00 | 33.00 | 28.00 | 7.00 | 8.00 |
| **$A_s$** | 6.43 | 4.26 | 3.30 | 2.67 | 1.21 | 1.08 |
| **Var** | 41.33 | 18.11 | 10.89 | 7.11 | 1.46 | 1.16 |
| **$A_m$** | 30.00 | 17.00 | 12.00 | 12.00 | 4.00 | 4.00 |
| **Min** | 22.00 | 28.00 | 28.00 | 22.00 | 5.00 | 6.00 |
| **Max** | 52.00 | 45.00 | 40.00 | 34.00 | 9.00 | 10.00 |
| **$C_v$** | 0.15 | 0.11 | 0.10 | 0.09 | 0.17 | 0.14 |
| **Skewness** | -1.62 | -0.78 | -0.01 | -0.08 | -0.39 | -0.26 |
| **Kurtosis** | 3.94 | 0.48 | -0.59 | 0.32 | -0.66 | -0.53 |

**Table 7** – Testing the students from the control group at the tehnic test in volleyball game

| Technical tests | Overhand pass to the wall | Overhand pass with partner | Underhand pass to the wall | Underhand pass with partner | Receiving the ball and send it to the setter | Service |
|---|---|---|---|---|---|---|
| **X** | 29.04 | 27.32 | 22.56 | 22.32 | 4.76 | 4.72 |
| **$M_e$** | 29.00 | 27.00 | 22.00 | 23.00 | 5.00 | 5.00 |
| **$M_o$** | 29.00 | 27.00 | 22.00 | 22.00 | 4.00 | 5.00 |
| **$A_s$** | 3.43 | 3.20 | 3.01 | 3.80 | 1.56 | 1.59 |
| **Var** | 11.79 | 10.23 | 9.09 | 14.48 | 2.44 | 2.54 |
| **$A_m$** | 17.00 | 16.00 | 15.00 | 14.00 | 6.00 | 6.00 |
| **Min** | 18.00 | 17.00 | 15.00 | 14.00 | 2.00 | 2.00 |
| **Max** | 35.00 | 33.00 | 30.00 | 28.00 | 8.00 | 8.00 |
| **$C_v$** | 0.12 | 0.12 | 0.13 | 0.17 | 0.33 | 0.34 |
| **Skewness** | -1.20 | -1.66 | -0.09 | -0.81 | 0.29 | 0.57 |
| **Kurtosis** | 3.60 | 4.59 | 1.41 | -0.15 | -0.69 | -0.18 |

X – Arithmetic mean $M_e$ – Median $M_o$ – Module $A_s$ – Standard deviation
Var – Variation Am – Amplitude Min – Minimum value Max – Maximum value

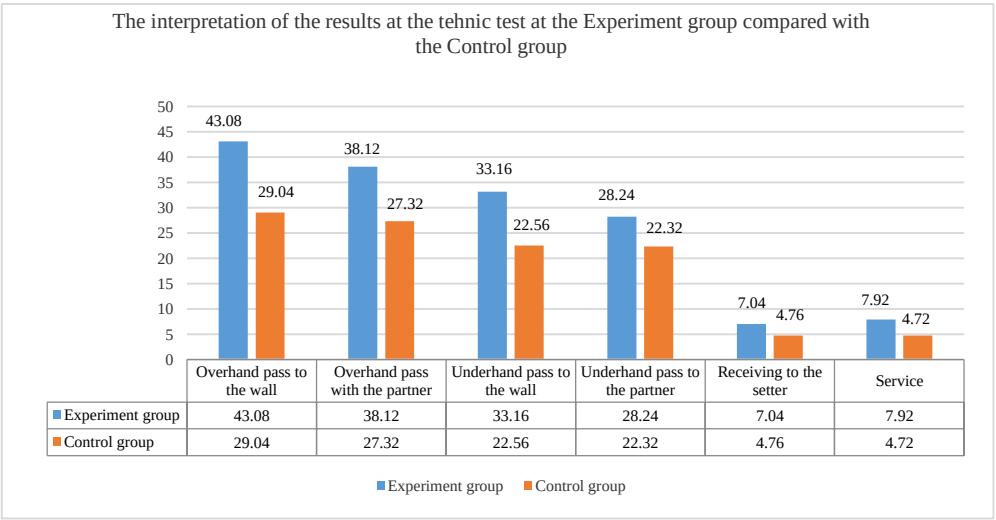


**Figure 4**. – The interpretation of the results at the tehnic test at the Experiment group compared with the Control group

Analyzing the differences in the results from the technical test in the volleyball game (Figure 4) in the two groups, experiment, and control, we can see the following:

- in the case of the "overhand pass to the wall", the experimental group recorded an average of 43.08 reps higher than the control group where we recorded an average of 29.04 reps; applying the significance T test we noticed that the value of t was -1.65449 and p of 0.046789, p <0.05, indicating a significant difference between the two groups of students.

- for the "overhand pass with partner" test we recorded an average of 38.12 reps in the experimental group compared to an average of 27.32 reps for the control group; So we notice a difference of 10.80 reps, applying the significance T test we found that the value of t was 1.21310 and p of 0.234098, p> 0.05, which indicates a insignificant difference between the two groups of students.

- In the "underhand pass to the wall" test, we recorded a higher value in the experimental group of 33.16 reps compared to 22.32 control group reps; the difference between the groups was 5.92 reps. Applying the significance T test we noticed that the value of t was -1.245057, and p of 0.013923, p< 0.05, indicating a significant difference between the two groups of students.

- at the "underhand pass with partner" test, we observed an average of 28.24 reps superior to the control group, which recorded an average of 22.32 reps; the difference between the groups being of 5.92 reps. Applying the significance T test we noticed that the value of t was -1.264334 and p of 0.217754, p> 0.05, which indicates an insignificant difference between the two groups of students.

- in the test "receiving the ball to the setter" in the experimental group we recorded an average of 7.04 repetitions higher than the control group which recorded an average of 4.76 reps; the difference between the groups was 2.28 reps. Applying the significance T test we noticed that the value of t was -2.230461 and p of 0.046221, p< 0.05, which indicates a significant difference between the two groups of students.

- in the "service" test, we recorded an average of 7.92 reps in the experimental group than the control group that had an average of 4.72 reps; the difference between the two groups being 3.2 reps. Applying the significance T test, we noticed that the value of t was 1.231145 and p of 0.023056, p <0.05, which indicates a significant difference between the two groups of students.

## CONCLUSIONS

Training programs with agonistic means and dynamic games from volleyball in primary school student schedule, can help in the development of bio-motor capacity, and physical development, and can be an important mean of learning this sport. We can affirm that the study hypothesis was validated by the results obtained from the tests and the final measurements, there were significant differences in the experimental group between the two tests and also between the two groups.

The conclusion of our study showed that anthropometric development is better at the experiment group which practice extra sport training programs with volleyball games and agonistic dynamic games compared with the control group which practiced classic physical education. As we can see in Figure 3, the anthropometric development was better at the experiment group in every parameter analysed: height, weight, torso, wing span, length of inferior and superior members, biacromial and bitrohanterian diameters and thoracic perimeter.

Also we can see in Figure 4 that children from the experiment group developed better their skills in volleyball game compared with the control group at the overhand pass at the wall and with partner, underhand pass at the wall and with partner, receiving the ball to setter and service.

After the analyse of the effects of dynamic games we can conclude of the research

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