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ANALYZING AND COMPARING ANTHROPOMETRIC INDICES AS CONTRIBUTORY FACTORS OF INFLUENCE IN SPORTS PERFORMANCE

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Abstract: Sports anthropometry techniques and procedures have been developed over numerous studies and applied in research related to physical or biological anthropology. The purpose of our study was to provide some individual reference anthropometric values in terms of body height and weight, age, the highest points reached by the use of both hands in attack and block actions. The provided data will give us a general overview of the players' anthropometric characteristics regarding their court position. Furthermore, the team position specialization also requires some other biomechanical and dynamic indices of female volleyball players. Values found for height, body weight, and body mass index (BMI) showed similar trends and different characteristics depending on each player's specialization. Our research was conducted in the "Anton Pongratz" Sports Hall within the University of Medicine, Pharmacy, Science, and Technology (UMFST) of Târgu Mureş, for the applied part, and the Department of Human Movement Sciences, for the part of the theoretical foundation of our study. We had a sample group of 12 subjects, all high-performance sports players from the National University Centre of Excellence in Volleyball (NUCEV) – for female teams as an institutional part of the University Sports Club (USC) of UMFST Târgu Mureş. We reported the results of our subjects to a large sample, including 1459 female players who have participated in seven editions of World Championship and Olympic Games between 2000 and 2012. Players' data information was obtained from several different competition databases posted on the International Volleyball Federation (FIVB) official website (www.fivb.org) and from more specialized published papers (i.e. ISI or BDI journals) dealing with this topic. As a result of our study, we can emphasize that we have found a positive correlation between Height to Spike reach and block reach ($r = 0.6531$, $p < 0.05$ / $r = 0.6170$, $p < 0.05$), spike reach and block reach ($r = 0.5883$, $r2 = 0.3461$, $p < 0.05$ / $r = 0.6044$, $r2 = 0.3653$, $p < 0.05$) $r = 0.4565$, $r2 = 0.2083$, $p > 0.05$ / $r = 0.4759$, $r2 = 0.1178$, $p > 0.05$).

* Szabo Dan Alexandru

Key words: volleyball, bio-motor index, sports performance, BMI.

* * * * * *

INTRODUCTION

Assessing body composition and anthropometric measurements in athletes can help optimize performance in competitions and monitor success in training and are, therefore, of considerable interest to sports professionals (Ackland et al., 2012). Following specialized studies, it can be argued that improving body composition in athletes is associated with improved cardiorespiratory capacity (Hogstrom et al., 2012) and resistance (Granados et al., 2008). Body structure might also be similar to health problems because therapeutic difficulties may result in sportspeople with shallow body mass, extreme mass changes due to dehydration or eating disorders (Wang et al., 2002). As a subdomain in anthropology, anthropometry has as its object the study of the physical dimensions of the human body for their use in anthropological classifications and comparisons and the appropriate measuring techniques (Budescu, 2013). Passing through prepubertal stages is influenced by biological and growth changes and temperament and personality, social influences, and mature expectations (Bagiu, 2007). Underlining the significant influence of genetic predisposition on performance in modern sports, it should be highlighted that the level of knowledge in this field is based, to a significant extent, on some assumptions and not on accurately proven facts. Among other things, it was demonstrated what kind of genes determines the level of performance in the activity branches related to the manifestation of some speed or resistance qualities, and the results of associative research can only provide some relative images of the real role of different genes - candidate (Jones et al., 2002; Myerson et al., 2000). The situation is also complicated because the somatic aspect is most likely determined by a complex combination of a whole group of genes (Rankinen et al., 2001).

Volleyball is an activity distinguished by supreme-high-intensity interval training motor action and a short duration of this kind of action (jumping, attack, and blocking), followed by periods of reduced physical effort. These actions are influenced by anaerobic metabolism's efficiency, having aerobic metabolism that contributes to maintaining physical performance and post-exercise recovery (Hedrick, 2007; Sheppard et al., 2009). Research shows that supreme-performance volleyball sportspeople get much improve physical and anthropometric wellness than volunteer sportspeople (Gabbett et al., 2007). Therefore, volleyball requires a physical ailment at the maximum degree in addition to tactical and technical performance. To maximize the athletes' adaptive responses and performance, volleyball teams implement other physical training models based on field-specific movement, especially during pre-competitive phases. Resistance preparation is acknowledged as an efficient method of developing neuromuscular capacity between the strategies applied, which increases competitive performance. The manipulation of intensity factors through strength preparation (intensity, volume, etc.) and his delivery over time permits improved physical capacities such as durability, maximal strength, and coordination.

According to a protocol commonly used to assess physical capacity in volleyball, the height reached in the vertical jump test reflects the strength of the limbs (Cronin et al., 2005). However, volleyball lacks protocols that take into account specific motor actions that reflect different simultaneous physical skills. The workout volume for the lower part of the body's plyometric indices is typically quantitated as the number of jumps per exercise session. Previous training guidelines for beginners, intermediate, and advanced participants were 80–100, 100–120, and 120–140 jumps per plyometric training session (Potach et al., 2008). However, the more recent recommendations suggest 80–100 jumps per session for beginner adult athletes, up to 200 for high-intensity plyometric exercises for trained adult athletes. Practically, up to 400 low-intensity

plyometric exercises per training session for adult learners are recommended (Chu et al., 2013). As such, the recommendations for plyometric training workload range between 80 and 400 jumps per training session. Currently, no study has evaluated the optimal plyometric training volume. The role of information technology in our lives must not be neglected. Electronic devices are beneficial in nowadays sports performance as many scientific papers prove (Szabo et al., 2019a)

Previous studies examined the effects of training with plyometric exercises in the training program with a volume between 60 and 100 jumps per training session (Ebben et al., 2010) (Petushek et al., 2010). These studies have shown that the regular training program effectively increases the height of the vertical jump, maximum power, and concentric and eccentric speed. While theoretical recommendations suggest plyometric training programs with 200 jumps per training session, programs with a lower volume have proven to be useful for increasing performance (De Villarreal et al., 2009). Plyometric training is practical when it has a prescribed daily volume range that has been periodically reduced from 60 to 100 jumps to 140 jumps per training session (Miller et al., 2006). Theoretical recommendations have proposed a volume of up to 200 jumps, with a high-intensity plyometric exercise per training session (Chu et al., 2013).
Some scientific papers discovered the negative statistical influence of sports on preventing deficiencies (Szabo et al., 2019b).

The Anthropometric indices are the result of mathematical operations that correlate two or more anthropometric or psychometric data. They allow a more complete and complex interpretation of anthropometric data. Calculation of strength indices allows an interpretation of anthropometric data and more precise guidance for training.

MATERIALS AND METHODS

Participants and location of the research

The study conducted by us investigated the referential indices in terms of height, weight, age, spike, and block by volleyball players depending on the court position and performance sports, on a group of 12 subjects, sports performance women who play for the National University Center of Excellence in Volleyball from Târgu Mureș. Our research was conducted at the Anton Pongratz Sports Hall within the George Emil Palade University of Medicine, Pharmacy, Science, and Technology (UMFST) of Târgu Mureș, the practical part, and the Department of Human Movement Sciences, for the part of the bibliographic study. The research period was from 15.04.2017 to 01.07.2017.

Table 1. Anthropometric information of the research subjects.

No.	Subjects initials	Age (years)	Height (m)	Weight (kg)	BMI	Spike (m)	Block (m)
1.	B.A.	20	1.80	58	17.9	2.95	2.86
2.	V.E	19	1.88	71	18.8	3.10	3.02
3.	S.S.	18	1.83	70	19.1	2.85	2.74
4.	L.T	18	1.80	70	19.4	2.90	2.81
5.	C.A.	19	1.84	70	19	2.93	2.84
6.	B.R.	17	1.86	71	19	2.88	2.79
7.	A.C.	19	1.80	67	18.6	2.87	2.80
8.	D.L	19	1.82	61	16.7	2.89	2.79
9.	R.L.	18	1.66	58	17.4	2.65	2.50
10.	I.R.	19	1.86	70	18.8	3.07	2.99
11.	A.C.	17	1.84	70	19	2.90	2.81

12.	M.L	20	1.70	60	17.6	2.63	2.51
	Average	**18.58 ± 0.9962**	**1.808 ± 0.06538**	**66.33 ± 5.382**	**18.44 ± 0.8361**	**2.885 ± 0.1378**	**2.788 ± 0.1556**

Material and research methods

In the first part of the article, we statistically analyzed whether height, weight, and BMI influenced the spiking and blocking efficiency of the components of the National University Centre of Excellence in Volleyball (NUCEV), in order to determine precisely in which of them there is a positive correlation. All these were achieved with the aid of correlation coefficients Pearson R and Spearman R.

In the second part of our study, we analyzed 1459 female players who participated in the volleyball competitions of the 2000 Olympic Games, the 2002 World Championship, the 2004 Olympic Games, the 2006 World Championship, the 2008 Olympic Games, the 2010 World Championship, and the 2012 Olympic Games. Information regarding the players was retrieved from the different championship databases on the FIVB official website (www.fivb.org) and several technical articles concerning this topic (Palao et al. 2014). A descriptive, correlational, and longitudinal design was used. The variables studied were: the position of the player (Setter, Centre, Outside hitter, Opposite hitter, and Libero), team level (the first level: ranked first - fourth, second level: ranked 5–8, or third level: ranked 9th to the last position), body height (m), weight (kg), body mass index, and player age (years). We compared all these results from the average perspective with the volleyball players from Târgu Mureş National University Centre of Excellence in Volleyball (NUCEV).

Gualdi-Russo and Zaccagni (2001) studied the somatometric and anthropometric specific components for female volleyball players (n=244) according to the field's specific positions and the competition level Italian first and second volleyball league. In the 1992–1993 and 1993–1994 volleyball competitive seasons, they found differences between the two leagues' level, first and second, and the player's position on the court. They found similar results for female volleyball players in Greece (n=163). The research also revealed that higher-level players (First league vs. the Second league) were taller and had a lower BMI. The same trend was found for women's volleyball in the first Spanish division compared with the final team ranking (Martín-Matillas et al., 2014; Carvajal et al. 2012) analyzed specific anthropometric and somatometric data in a study of the women's volleyball team from Cuba at three Olympic Games (from 1992 to 2000).

RESULTS

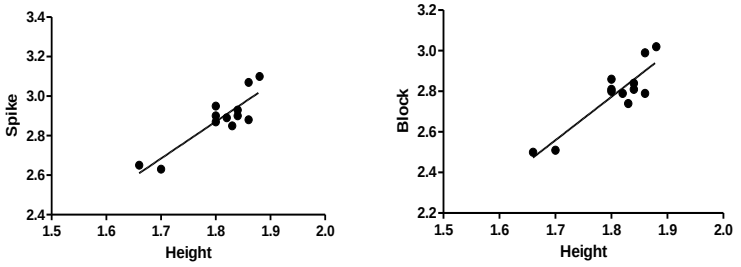
Statistical results

Table 2. Height to spike reach and block reach correlation

Height	**Spike**	**Block**
Number of XY Pairs	12	12
Spearman r	**0.6531**	**0.6170**
95% confidence interval	0.1075 to 0.8964	0.04737 to 0.8838
P value (two-tailed)	**0.0213**	**0.0326**
Is the correlation significant? (alpha=0.05)	Yes	Yes

Correlation coefficient r = 0.6531, positive correlation, a high value of height correlates with a high spike value (a person with higher values in height will have a high value at spike point). The correlation is statistically significant ($p < 0.05$). Correlation coefficient r = 0.6170, positive correlation, a high value of height correlates with a high value of the block point (a person with a

high value of height will have a high value at the block point). The correlation is statistically significant ($p < 0.05$).



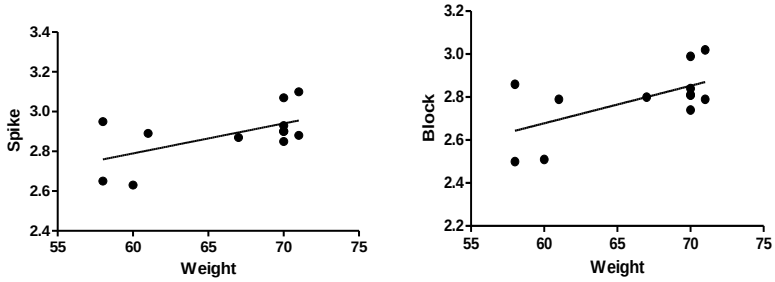
(a) **(b)**

Figure 1. Height to spike reach (a) and height to block reach (b)

Table 3. Weight to spike reach and block reach correlation

Weight	Spike	Block
Number of XY Pairs	12	12
Pearson r	**0.5883**	**0.6044**
95% confidence interval	0.02159 to 0.8689	0.04659 to 0.8749
P value (two-tailed)	**0.0442**	**0.0374**
Is the correlation significant? (alpha=0.05)	Yes	Yes
R squared	**0.3461**	**0.3653**

Correlation coefficient r = 0.5883, positive correlation, a high value of weight correlates with a high value of spike point (a person with a high weight value will have a high value at the spike point). The correlation is statistically significant ($p < 0.05$). Coefficient of determination ($r2 = 0.3461$), 34.61% of the variance between spike values in the studied group is due to weight variations. Correlation coefficient r = 0.6044, positive correlation, high weight value correlates with a high value of the block point (a person with a high weight value will have a high value and block point). The correlation is statistically significant ($p < 0.05$). The determination coefficient ($r2 = 0.3653$), 36.53% of the variation existing between the studied group's block values, is due to variations in weight.



(a) **(b)**

Figure 2. Weight to spike reach (a) and weight to block reach (b)

Table 4. BMI to spike reach and block reach correlation

BMI	Spike	Block
Number of XY Pairs	12	12
Pearson r	**0.4565**	**0.4759**
95% confidence interval	-0.1593 to 0.8165	-0.1350 to 0.8246
P value (two-tailed)	**0.1358**	**0.1178**
Is the correlation significant? (alpha=0.05)	No	No
R squared	**0.2083**	**0.2265**

Correlation coefficient r = 0.4565, positive correlation, a high BMI value correlates with high value at the spike point (a person with a high BMI value will have a high value at the spike point). The correlation is not statistically significant (p> 0.05). The determination coefficient (r2 = 0.2083), 20.83% of the variance between spike values in the studied group, is due to their BMI variation. Correlation coefficient r = 0.4759, positive correlation, a high BMI value correlates with high value at the block point (a person with a high BMI value will have a high value at the block point). The correlation is not statistically significant (p> 0.05). The coefficient of determination (r2 = 0.2265), 22.65% of the variation between the studied group's block values, is due to their BMI variation.

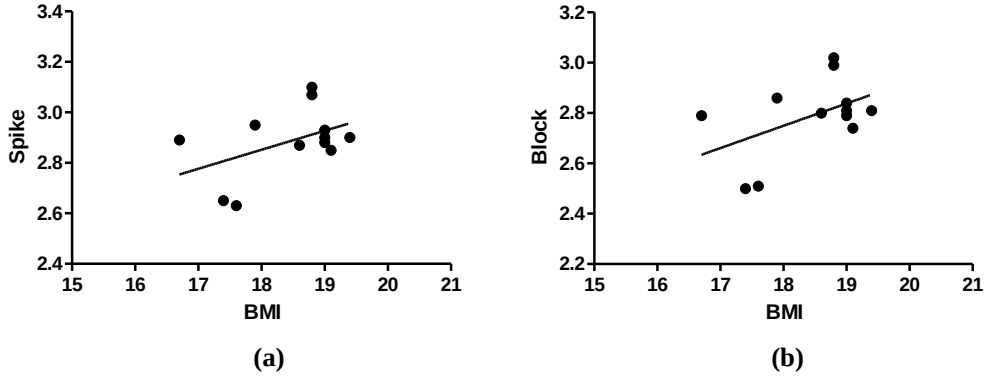


Figure 3. BMI to spike reach (a) and BMI to block reach (b)

Centralization of anthropometric data

Table No. 5 presents the average of the height of the players in the seven final tournaments that we analyzed, the weight, the body mass index, the spike reach, the block reach, and the comparison of the world's elite average compared with the National University Centre of Excellence in Volleyball (NUCEV). The table also includes the height of the player, Weight, BMI, maximum spike reach point, maximum block reach point, and the age of volleyball players who participated in the OG and WC between 2000 and 2012, compared with NUCEV from Târgu Mures.

Table 5. The anthropometric data of players who participate in the last seven essential competitions

Competition	Height (m)	Weight (kg)	BMI	Spike (m)	Block (m)	Age (years)
2000 OG	1.82	71.7	21.8	3.05	2.90	25.3
2002 WC	1.82	70.4	21.3	3.01	2.88	24.8
2004 OG	1.82	71.6	21.5	3.03	2.91	26.1
2006 WC	1.82	69.9	21.1	3.00	2.88	24.8
2008 OG	1.83	70.1	20.9	3.03	2.91	25.6
2010 WC	1.83	69.8	20.9	3.00	2.88	27.1

2012 OG	1.82	69.5	20.9	3.01	2.88	26.2
Average (A_1)	**1.82**	**70.3**	**21.2**	**3.01**	**2.89**	**25.7**
Average (A_2)	**1.80**	**663**	**18.4**	**2.88**	**2.78**	**17**
Δ (A_1-A_2)	**0.02**	**4**	**2.8**	**0.13**	**0.11**	**8.7**

Legend: A_1 – the average of the players present at the seven major volleyball competitions
A_2 – the average of the NUCEV players

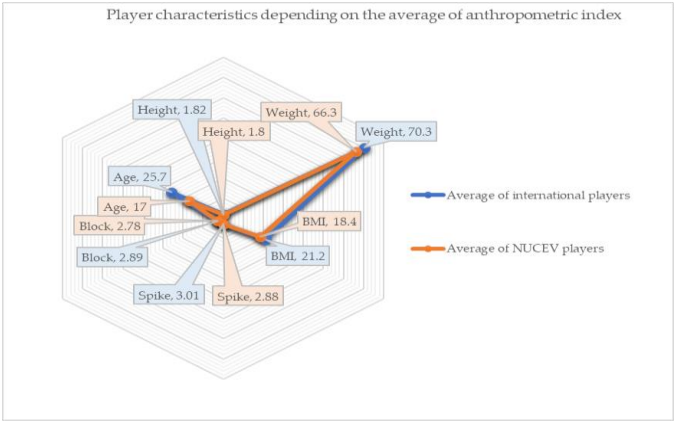


Figure 4. Player characteristics depending on the average of the anthropometric index

Comparison of the height index

From the teams participating in the final tournaments. In terms of height (Table no. 6), the tallest players were the centers, followed by the opposite hitters, outside hitters, setters, and Libero. There were no significant differences between the center and opposite hitter players. Teams that finished the competition between 1–4th places had the tallest players for all positions on the court.

Table 6. Characteristics of players depending on the place on the court and height

Place on the competition	**Place on court**					**Average (m)**
	Setter (m)	**Centre (m)**	**Outside hitter (m)**	**Opposite hitter (m)**	**Libero (m)**	
1–4	1.77	1.88	1.86	1.89	1.72	1.84
5–8	1.77	1.87	1.84	1.86	1.71	1.83
9–12	1.78	1.85	1.83	1.83	1.71	1.81
Average A_1	**1.77**	**1.86**	**1.84**	**1.85**	**1.71**	**1.82**
Average A_2	**1.80**	**1.85**	**1.83**	**1.83**	**1.68**	**1.80**
Δ (A_1-A_2)	**-0.03**	**0.01**	**0.01**	**0.02**	**0.03**	**0.02**

Comparison of National University Centre of Excellence in Volleyball (NUCEV) from Târgu Mureș/post results with those of the teams participating in the seven final tournaments, depending on the place in the ranking. As for the average height of the setters, at the NUCEV the average height was 1.80 m that was above all other averages. For the center players, the NUCEV average height was 1.85 m that was below the average of the participating teams but identical to teams ranked 9–12;

The outside hitter players were at the middle of the teams 9–12 ranking and below the average of the other top-ranked teams. The opposite hitters had a 1.68 m height average that was below the average of all ranked teams. With 1.68 m, the Libero players were under all the teams of the world elite. As a general average of 1.80 m height, the NUCEV players were below all teams' average.

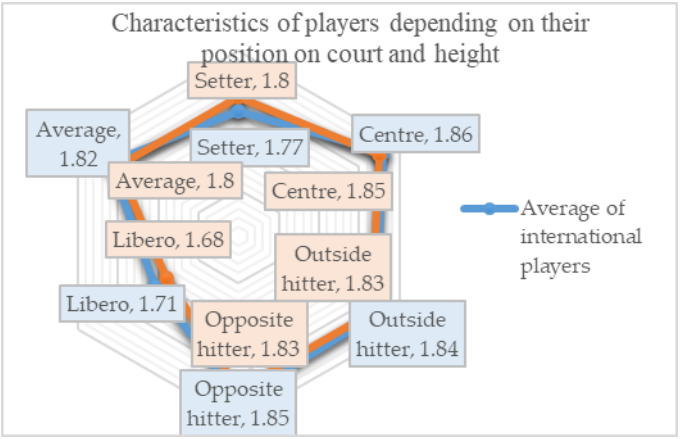


Figure 5. Characteristics of players depending on their position on court and height

Comparison of weight index

From the teams participating in the final tournaments:

Athletes with the highest average weight index were the center players, followed by outside hitters, opposite hitters, setters, and Libero. In the correlation of the weight index with the place in the ranking, the higher the place, the higher the weight index (a difference of 2–3 kg was observed).

Table 7. Characteristics of players depending on their position on court – Weight

Place in competition	Place on court					Average (kg)
	Setter (kg)	Centre (kg)	Outside hitter (kg)	Opposite hitter (kg)	Libero (kg)	
1–4	67.9	74.4	73.4	73.3	64.4	71.8
5–8	67.8	73.4	71.0	71.3	62.3	70.3
9–12	67.2	72.0	71.5	69.7	63.5	69.7
Average A_1	**67.5**	**72.9**	**71.8**	**70.9**	**63.4**	**70.3**
Average A_2	**58**	**70**	**67**	**70**	**59**	**64.8**
Δ (A_1-A_2)	**9.5**	**2.9**	**4.8**	**0.9**	**4.4**	**5.5**

Comparison of NUCEV/post results with those of the teams participating in the 7 final tournaments, depending on the place in the ranking and their average weight. As the average weight of the setter players, at the NUCEV the average was 58 kg, and it was under all the index of the participating teams. For center players, the NUCEV average weight was 70 kg, and it was below the average of the participating teams, comparing only with the teams ranked 9–12. The outside hitters' average weight was below the average of the other teams, namely 67 kg. The opposite hitters' having a 70 kg weight average were above the average of teams ranked 9–12, 69.7 kg, and below their overall average of 70.9. With an average weight of 59kg, the libero players were under all the teams of the world elite. As a general average of the weight index, 64.8 kg, the NUCEV players were below all teams' average.

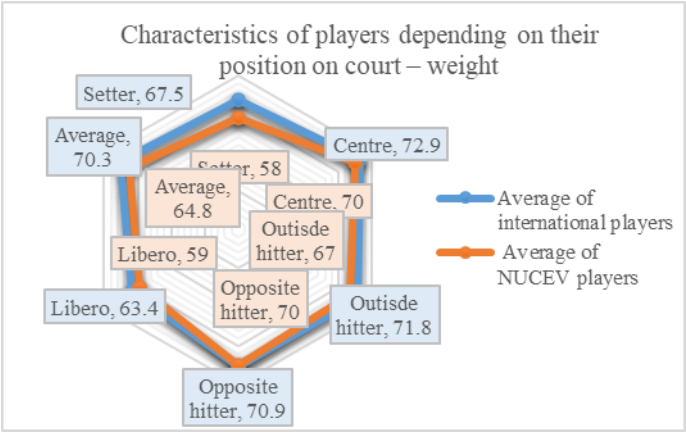


Figure 6. Characteristics of players depending on their position on court – Weight

Comparison of body mass index (BMI)

From the teams participating in the final tournaments.Values for BMI showed the same trends as body height and weight (Table 8). Opposite hitters had a lower BMI than the other players: setters, outside hitters, and Libero. Also, significant differences between centers and Libero were found. For all player positions, NUCEV BMIs were significantly lower than top BMIs.

Table 8. Characteristic of players depending on their position on court and BMI

Place in the competition	Position on court					Average
	Setter	Centre	Outside hitter	Opposite hitter	Libero	
1–4	21.6	21.0	21.3	20.7	21.8	21.2
5–8	21.6	20.1	21.1	20.7	21.2	21.1
9–12	21.4	21.0	21.	20.7	21.7	21.2
Average A_1	**21.5**	**21.0**	**21.3**	**20.7**	**21.6**	**21.2**
Average A_2	**17.9**	**18.9**	**18.3**	**19.1**	**17.5**	**18.3**
Δ (A_1-A_2)	**3.6**	**2.1**	**3**	**1.6**	**4.1**	**2.9**

Comparison of NUCEV/post results with those of the teams participating in the seven final tournaments, depending on the place in the ranking. As the average of the setter players, the NUCEV average was 17.9 points, an average that is below all the scores of the participating teams. For center players, the NUCEV average was 18.9 points and was below the average of all participating teams. The outside players were below the average of the other teams, with a BMI of 18.3 points. The opposite hitters had a 19.1 average BMI and were above the average of all teams in the ranking. With 17.5 points, the libero players were under all the world teams. The general average BMI of NUCEV players was 18.3 points below the average of all teams.

The maximum point of the spike (MPS)

From the teams participating in the final tournaments. Regarding the spike's maximum point (Table 9), the players who had the highest indices were centers and opposite hitters, followed by outside hitters, setters, and Libero. From the world elite teams, the higher the ranking, the higher the MPS index.

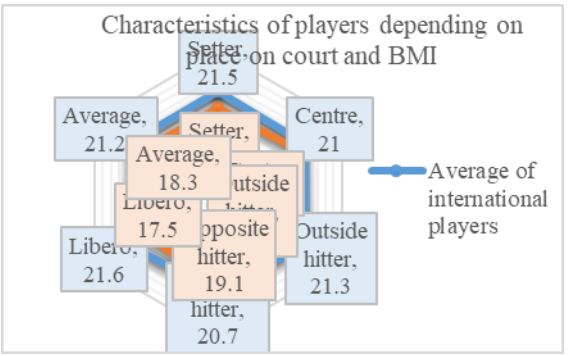


Figure 7. Characteristics of players depending on the place on the court and BMI

Table 9. Characteristics of players depending on the place on court and spike

Place in the competition	Place on court					Average (m)
	Setter (m)	Centre (m)	Outside hitter (m)	Opposite hitter (m)	Libero (m)	
1–4	2.96	3.12	3.09	3.12	2.88	3.06
5–8	2.98	3.12	3.09	3.08	2.85	3.05
9–12	2.90	3.03	3.01	3.02	2.80	2.98
Average A_1	**2.94**	**3.07**	**3.05**	**3.07**	**2.82**	**3.01**
Average A_2	**2.95**	**2.98**	**2.89**	**2.95**	**2.64**	**2.88**
Δ (A_1-A_2)	**-0.01**	**0.09**	**0.16**	**0.12**	**0.18**	**0.13**

Comparing the NUCEV/post results with those of the teams participating in the seven final tournaments, depending on the place in the ranking. As the average of the setters, the NUCEV players' average was 2.95 m that was above the average of the teams ranked 9–12. For center players, the NUCEV players' average was 2.98 m and was below the average of the participating teams. The outside hitter players were below the average of the other teams, 2.98 m. The opposite hitters had an average of 2.89 m and were under the average of all teams. With a 2.64 m average, the libero players were under all the teams of the world elite. As the general average of the maximum spike point reached was 2.88 m, the NUCEV players were below all teams' average.

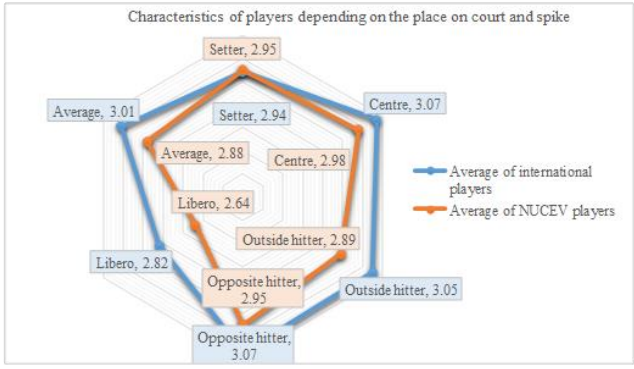


Figure 8. Characteristics of players depending on the place on court and spike

The comparison between the maximum block points (MBP) from the teams participating in the final tournaments. Regarding the maximum block point reached (Table 10), we noticed that the highest index players reached block points were centers and opposite hitters, followed by outside

hitters, setters, and Libero. From the volleyball elite, the MBP average rises gradually from teams 9–12 to teams 1–4.

Table 10. Characteristics of players depending on the place on court and block

Place in the competition	Place on court					Average (m)
	Setter (m)	Centre (m)	Outside hitter (m)	Opposite hitter (m)	Libero (m)	
1–4	2.84	2.99	2.96	2.98	2.76	2.93
5–8	2.87	2.99	2.95	2.96	2.74	2.93
9–12	2.79	2.91	2.89	2.90	2.69	2.86
Average A_1	**2.82**	**2.95**	**2.92**	**2.93**	**2.71**	**2.89**
Average A_2	**2.86**	**2.90**	**2.80**	**2.85**	**2.50**	**2.88**
Δ (A_1-A_2)	**-0.04**	**0.05**	**0.12**	**0.08**	**0.21**	**0.01**

Comparison between NUCEV/post results with those of the teams participating in the seven final tournaments, depending on the place in the ranking. As the average of the setter players, the NUCEV average was 2.86 m, which was above the average of the teams ranked 1–4 and 9–12. For center players, the NUCEV average was 2.90 m, which was below the average of the participating teams. The outside players were below the average of the other teams, 2.80 m. The opposite players had an average of 2.85 m and were under the average of all teams. At 2.50 m, the libero players were under the average of the teams in the world elite.As a general MBP average was 2.88 m, the NUCEV players were below all teams' average.

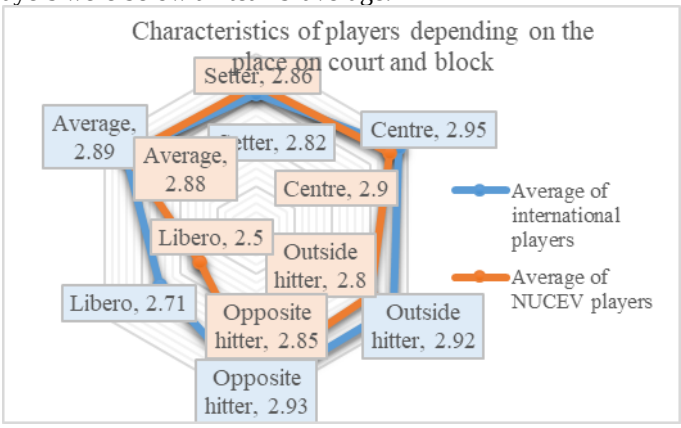


Figure 9. Characteristics of players depending on the place on court and block

Comparison of age index

From the teams participating in the final tournaments. In terms of age (Table 11), at the level of performance, the average age of players from the 1–4th place was significantly higher than at the 5–12 place players for setters, centers, outside hitters, and Libero. The only exception was the opposite hitter players, who were older in the 5–12 place teams.

Table 11. Characteristics of players depending on the place on court and age

Place in the competition	Place on court					Average (years)
	Setter (years)	Centre (years)	Outside hitter (years)	Opposite hitter (years)	Libero (years)	

1–4	27.0	26.0	26.2	25.4	28.0	26.3
5–8	25.8	25.7	25.9	25.9	26.6	25.9
9–12	25.4	24.6	25.5	25.6	25.5	25.3
Average A_1	**25.9**	**25.2**	**25.7**	**25.6**	**26.2**	**25.7**
Average A_2	**20**	**18**	**18.5**	**18.3**	**19**	**18.7**
Δ (A_1-A_2)	**5.9**	**7.2**	**7.2**	**7.3**	**7.2**	**7**

Comparison of NUCEV/post results with those of the teams participating in the seven final tournaments, depending on the place in the ranking. As the average age of the setters, the NUCEV average was 20 years old, below the average of the teams participating in the final tournaments. For center players, the average age of NUCEV was 18 years old that is below the average of the participating teams. Outside hitters were under the average of the other teams, 18.5 years old. The opposite hitters had an average of 18.3 years old and were below the average of teams ranked 9–12, who was 25.6 years old. As a general average of the age index, 18.7 years, the NUCEV players were below all teams' average.

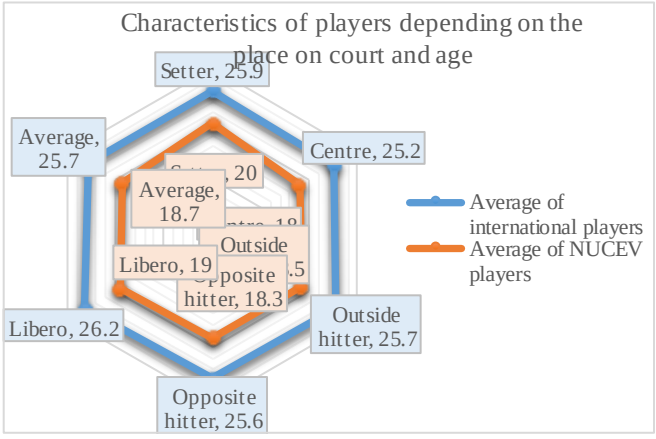


Figure 10. Characteristics of players depending on the place on court and age

DISCUSSIONS

As a first result, with respect to the correlation of the anthropometric indices of NUCEV, we can state that we found a positive correlation between Height to Spike reach and block reach (r = 0.6531, p <0.05 / r = 0.6170, p <0.05) Spike reach and block reach (r = 0.5883, r2 = 0.3461, p <0.05 / r = 0.6044, r2 = 0.3653, p <0.05) r = 0.4565, r2 = 0.2083, p> 0.05 / r = 0.4759, r2 = 0.1178, p> 0.05).

After this investigation, we can claim that the center volleyball players, the opposite volleyball players, and the outside hitter volleyball players are taller, more massive, and have better indices at the highest point reach of spike and block. These results confirm previous studies regarding the indices we investigated in this paper (Palao et al., 2014; Gualdi-Russo et al., 2001; Malousaris et al., 2008). The data provided in this research is generally because the primary purpose of this inquiry is to provide reference values. As far as performance is concerned, the best teams have centers, opposite hitters, and outside taller hitters with a higher weight index.

More precisely, the best teams ranked 1–4 in the final tournaments and have much better strength indices. This could be one reason for these teams' sports performance, as spike and block are the most meaningful actions in winning a point in the volleyball game (Palao et al., 2014; Palao et al., 2004; Palao et al., 2009). As for the average age, similar values were found between

the ranking positions of the teams. Differences between centers and Libero between teams ranked 1–4 and 9–12 place could indicate the importance of age indices, as for the 1–4 rank team players with the most experience in spiking and blocking.

These findings confirm previous studies that focused on developing the biometric qualities of volleyball players (Palao et al., 2014; Gualdi-Russo et al., 2001). The higher the ranking of the team, the higher the bio-motricity of their players. The data show that the level of teams participating in the Olympic Games and the World Championship, the physical and motor characteristics are of significant importance for the team's success in women's volleyball (Palao et al., 2014).

This study provides reference values to guide player selection, understand the game dynamics, and understand a team's role based on the position on the court. The players' characteristics result from the selection process (natural and intentional) and the specific training in the sports training specific to this game. Information about players who have participated in final significant tournaments can be used as reference criteria in volleyball's multifactorial talent selection process. From a general perspective, the results indirectly show that long-term specialized training is required after technical training. The acquisition of competition experience of a minimum duration of 10–12 years is necessary to achieve peak performance, in addition to the importance of bio-motor factors (Palao et al., 2014).

CONCLUSIONS

The model of the determinants of sports performance in the endless selection of the volleyball game, the anthropometric indices will find their usefulness at the selection level and the specialized sports practice. The results show the differences between body height, maximum blocking point, maximum spike point, and players' age depending on the court's position. These differences are related to the needs of the various specific posts in terms of the actions that take place there.

Centers, opposite hitters, and outside hitters have favorable abilities to block and spike, and the setters and Libero have abilities that can be more suited for the second line, receiving the ball and defense. The anthropometric and force indices that differentiate the first teams at this level by teams ranked lower. The athletes' physical characteristics have a tremendous influence on the performance level, which has been dealt with in many research papers, revealing that the height index can play a significant role in contributing to some sports' success, offering some natural advantages. Due to the results of descriptive investigations, a new demand has emerged in sport anthropometric research, and the focus of new investigations has become analysis - the relationship between anthropometric and motor characteristics.

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THE IMPORTANCE OF VOLLEYBALL GAME IN PHYSICAL EDUCATION LESSONS AT GYMNASIUM LEVEL

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Abstract: Volleyball game can be a method for fulfilling the objectives of the physical education lesson, being fun and also doesn't require many materials and space. Our research studied the influence of volleyball game on a grup of 25 girls with age between 13-14 years from a gymnasium school. The methods used were experimental using some specific volleyball test like anthropometric measurments, speed running, endurance running, long jump, flexibility, abdominal strength, triple jump, 6 m x 5 m running. The results showed good improvements in every assessment comparing the results between the initial and final evaluation. Conclusions highlighted the idea that volleyball game can be a good method for fulfilling the objectives of every physical education class and also improve motor qualities and develop skills.

Key words: physical education, volleyball game, physical development, sports.

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INTRODUCTION

Volleyball game is one of the physical activities that is included in game and sports activities (Yudiana, 2015). Therefore, volleyball game becomes one of the sports that popular among the society.

Volleyball game is considered an intermittent sport with effort and rest (Marques, 2018). The actions during the match are of short duration (rally of 1 to 10 seconds) and with longer rest duration (11 to 30 seconds) (Padilla et al., 2018; Turpin et al., 2019).

Volleyball game, relatively simple, once, by training players and multilateral actions scroll speed of the game, get to enjoy a wide increasingly accepted by the audience (Cojocaru et al., 2018). The game of volleyball has a wide range of actions in the game, from the simplest to the most complex. This required the players to continue training and persevering, and staging the sequence of processing the learning and teaching for coaches, which gives a touch of increased

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subtlety of this game (Szabo, 2015a). Practicing intense dispute between the actions of attack and defense to win points, based on a thorough analysis of the structure and orientation in new directions, according to current and future needs, displays volleyball game in the first world affirmation plans with other sports performance (Ioniță, 2007).

The volleyball is a complex sport because the athlete needs of good technique and tactic, adequate psychological preparation and excellent physical preparation (Marques Jr., 2019). The volleyball match is practiced with six skills during the game (Marques Jr. et al., 2017). The serve, the attack and the block are the skills that the volleyball player practices point and the reception and the set are the skills of construction and offensive development (Padilla et al., 2018).

Volleyball has become one of the most practiced sports in the world. The game of volleyball requires expertise in several physical fitness and performance and often depends on an individual's ability to jump on very highlevel parameters (Szabo, 2015a; Petrovici, 2020; Szabo, 2015b, Szabo, 2016; Szabo, 2019).

Volleyball as a game, due to its peculiarities, has been able to win over the years an appreciation from all children and young people but also from adults. Having the opportunity to practice at all age levels, volleyball is perceived as a beautiful sports game and also an important means of physical education (Savu et al., 2018).

At the level of beginner groups, care for developing the above-mentioned motor skills should be a primary goal, especially knowing that at other stages of motor skills the speed and skill are very difficult or not at all perfectible (Savu, 2015).

The volleyball game, together with other sport games represent one of the means of achieving the objectives of physical education in school, framed in the general methodology of teaching and learning of this game. It is in a permanent evolution, adapting the instruction methods and the preparation means, respecting the general principles of applying them (Milcu, 2013).

Due to the multiple and complex aspects which must be solved in the framework of the learning process, we must appeal to principles, methods, organisation forms and adequate means which should ensure a maximum efficiency. This is why, the optimization of learning and consolidation of game actions in volleyball during the physical education class in gymnasium and the aware participation of the pupil become stringent requirements (Milcu, 2013).

Because of the many challenges in the learning and teaching process, various methods are required to teach sport skills (Da Silva et al., 2007). Modified games have become a useful pedagogical framework to teach different types of sports in physical education class (Arias et al., 2011). Simplifying, adapting and modifying physical education activities can be beneficial for student learning (Griffin et al., 2005). Modified volleyball game is a viable format to maximize beginners' participation and learning opportunities (Melendez et al., 2019).

Modified games have emerged as a pedagogical framework to teach different sports in the PE field (Nathan, 2015; Arias et al., 2011). Simplifying, adapting, and modifying PE activities and games can be beneficial for student learning (Griffin et al., 2005). Moreover, various studies have reported that modified games increase participation during playing time, improve decision making, and physical activity (Bělka et al., 2016; Clemente et al., 2015 Mahedero et al., 2015; Danielle et al., 2014; Van Acker et al., 2010)

However, because of the complexity of the learning and teaching process, various methods are required to initiate volleyball practitioners (da Silva et al., 2007). For that reason, the modified version of the context of volleyball could play a vital role in increasing student participation and physical activity levels (Szabo et al., 2020). The concept of volleyball on reduce space is a modified game from the sport that has been used worldwide as a framework for teaching (Sample et al., 2012; Kessel, 2009; Petrovici, 2020). Volleyball is a team sports game that has spread very rapidly on all continents since its appearance. In ourcountry, volleyball game is divided in both mass and performance competitions (Sopa et al., 2017).

PURPOSE

The purpose of the research was to analyze the importance of volleyball game in physical education lessons at gymnasium level and to highlight the characteristics that this game could develop being an important method in improving and developing motor qualities.

OBJECTIVES

The objective of our investigation was to evaluate the effects of implementing volleyball means through physical education classes and analyze their effects on body development.

HYPOTHESES

If the game of volleyball will be included in the content of the bilateral instructive-educational process, specific to the activity of physical education and sports in secondary education, the effects in terms of strengthening health, physical and mental development can be multiple and beneficial.

MATERIALS AND METHODS

Performance coefficient was developed by Coleman (2002) with the objective of determine the performance of the volleyball skills. Coleman (2002) practiced the following classification of the performance coefficient for the volleyball skills: 2,50 or more is an excellent performance of an international level volleyball team, 2,30 to 2,49 is a low performance of an international level volleyball team, 2,20 to 2,29 is a good performance of a club level volleyball team, 2 to 2,19 is a medium performance of a club level volleyball team and 1,99 or less is a bad performance of a club level volleyball team. In our experiment we used the specific motor evaluation grid provided by the Romanian Volleyball Federation for the age level corresponding to our research sample.

Sample of students, location of the research

In order to carry out the study in optimal conditions, we had the opportunity to attend the physical education and sports classes provided in the common core, the 7th C and 7th D classes of the Mircea cel Bătrân National College from Râmnicu Vâlcea.

The sample on which we performed the study consisted of a number of 25 students (girls) from the above mentioned classes, born in 2004-2005, in which we performed anthropometric measurements. As a result of anthropometric measurements I can conclude that the students tested have a normal development for this age level.

The arithmetic mean of body height is 164.6 cm in this group of students, and the average body weight is 54.7 kg.

To verify the general hypothesis and the working hypothesis, we applied on this sample of students, a battery of tests and control tests provided by the National Assessment System for the discipline of physical education and sports, as well as a battery of control tests specific to the game. volleyball.

This study was conducted during the school year 2017-2018, and to meet the objectives and tasks of the paper, as well as to verify the hypotheses of tests - tests and control rules were applied in two stages:

1. initial testing: October - November 2017;
2. final testing: April - May 2018.

Description of physical control samples

Waist - from the standing position with the heels close, back to the wall, height measurement.

Running speed over a distance of 50 m: It was performed on flat ground, starting from the starting position standing at the individual beep. Each subject has the sample on which the study was performed and performed this control test twice, at an interval of a few days both in the test

and in the final one. The best result was recorded, the expression being made in seconds and tenths of a second.

Endurance running: this control test was performed at a distance of 1000 m, on a properly arranged route. The results of this test were expressed in minutes and seconds.

Long jump on the spot: This test was performed on flat ground in a properly marked area, each subject being entitled to three trials. The best performance was recorded, its expression being made in meters and centimeters.

Vertical jump, with momentum, reaching the maximum point, with one hand - attack momentum, jumping and touching as high as possible with the arm outstretched.

Vertical jumping, from the spot, reaching the maximum point, with two hands - elan of arms, jumping and touching with both hands as high as possible.

Lateral movement on 4 m - from lateral bending with touching the line with the hand, movement with added or crossed steps on the distance of 4 m for 45 s. The touches of the lines with the hand are counted.

Frontal flexibility - from the standing position, on the edge of the gym bench, close toes and knees outstretched, bending the torso with outstretched arms.

Abdominal strength - from the supine position, with the knees bent, the arms free, raising the torso vertically with the chest touching the knees, returning with the touch of the shoulder blades on the ground. The correct repetitions are counted, performed in 2 series of 30 seconds each with a break of 15 seconds.

Triple jump from both legs - from the standing position with the legs apart at shoulder level, three jumps from squatting to squatting, without stopping between them.

6 m x 5 reps back and forth - from the starting position standing, free forward forward followed by backward movement

Table 1. Evaluation scale for motor assessment

Index	Evaluation tests				
	Lateral movement (45sec)	**Triple jump** (metri)	**Flexibility** (cm)	**5x6m movement** (sec)	**Abdominal force** (30/15/30)
1.00	40	10	30	6.51	76
0.95	39	9.75	29	6.67	74
0.90	38	9.5	27	6.83	72
0.85	37	9.25	26	6.99	70
0.80	36	9	24	7.15	68
0.75	35	8.75	23	7.31	67
0.70	34	8.5	21	7.47	66
0.65	33	8.25	20	7.63	64
0.60	32	8	18	7.79	62
0.55	31	7.75	17	7.95	60
0.50	30	7.5	15	8.11	59
0.45	29	7.25	14	8.27	58
0.40	28	7	12	8.43	56
0.35	27	6.75	11	8.59	54
0.30	26	6.5	9	8.75	53
0.25	25	6.25	8	8.91	51
0.20	24	6	6	9.07	49
0.15	23	5.75	5	9.23	47
0.10	22	5.5	3	9.39	45
0.05	21	5.25	2	9.55	44
0.01	20	5	0	9.71	43
0.00	19	4.99	-1	9.87	42

Jump index = [(Waist / net height) x (Jump on the spot with 2 hands - net height + Jump with one hand - net height)] / 100

General motor index = Jump index + Lateral displacement index + Triple jump index + Flexibility index + 5x6 displacement index + Abdominal index

Table 2. Motor evaluation table for women volleyball players with age between 14-16 years old

	Women			
	Hope (13-14 years old)		Cadets (15-16 years old)	
	National team	National championship	National team	National championship
Jumping index	0.80	0.50	0.60	0.40
Lateral movement index	0.50	0.35	0.40	0.30
Flexibility index	0.40		0.35	
Abdominal force index	0.50		0.40	
Triple jump index	0.35		0.25	
5x6 m movement index	0.45		0.40	
General motor index	3.00	2.15	2.40	1.65

The general motor index will be calculated by summing the values of all indices.

The full accomplishment of the tasks of this paper was not possible without the careful use of research methods, of real support being both the methods of data processing and those of drawing conclusions.

A basic condition in the realization of the paper was the documentation, the search for bibliographic sources that deal with the topic of the paper, the recording and selection of these resources, as well as the processing - interpretation of the data obtained. Among the investigation methods used, methods that allow direct contact with the instructive-educational phenomenon, the following were used: observation method, experiment method, statistical method, test method, etc.

The usual statistical-mathematical indicators in the analysis of the data obtained by measurement are: the parameters of the central tendency - whose indicators are: modulus, median and arithmetic mean.

RESULTS

Table 3. Anthropometric informations regarding the experiment group

Statistical informations (N = 25)	Age (years)	Height (cm)	Weight (kg)	Wing span (cm)	Biacromial diameter (cm)	Bitrohanterian diameter (cm)	BMI
Average	14.40	164.65	55.19	166.08	35.36	42.28	20.16
Coefficient of variability	0.25	21.51	9.10	18.33	1.74	3.54	0.43
Standard deviation	0.49	4.54	2.92	4.19	1.29	1.84	0.64
Val. Min	14.00	156.00	50.00	160.00	33.00	40.00	18.60
Val. Max	15.00	175.00	61.00	172.00	38.00	46.00	21.60
Skewness	0.43	0.21	0.01	0.06	0.45	0.50	-0.56
Kurtosis	-1.98	-0.32	-0.45	-1.43	-0.39	-0.95	1.41
Mode	14.00	160.00	55.00	165.00	35.00	42.00	20.50

Table 4. Results of the initial motor evaluation

Statistical informations (N = 25)	Speed running 50 m	Endurance running 1000 m	Long jump	Lateral movement	Triple jump	Flexibility	6x5 m movement	Abdominal force
Average	7.90	3.94	1.85	24.28	6.25	12.92	8.34	45.96
Coefficient of variability	0.10	0.15	0.01	2.38	0.00	6.74	0.17	31.04
Standard	0.31	0.38	0.11	1.51	0.04	2.54	0.40	5.46

deviation								
Val. Min	7.50	3.42	1.65	20.00	6.19	9.00	7.82	38.00
Val. Max	8.80	4.45	2.10	27.00	6.35	20.00	8.94	58.00
Skewness	1.07	-0.15	0.38	-0.81	0.93	0.79	0.23	0.46
Kurtosis	1.45	-1.93	-0.14	1.22	0.25	0.74	-1.67	-0.78
Mode	7.80	4.15	1.75	25.00	6.25	12.00	8.75	50.00

Table 5. Results of the final motor evaluation

Statistical informations (N = 25)	**Speed running 50 m**	**Endurance running 1000 m**	**Long jump**	**Lateral movement**	**Triple jump**	**Flexibility**	**6x5 m movement**	**Abdominal force**
Average	7.81	3.88	1.88	22.96	6.47	14.36	8.10	49.48
Coefficient of variability	0.08	0.14	0.01	2.29	0.07	6.57	0.07	34.84
Standard deviation	0.28	0.37	0.11	1.48	0.25	2.51	0.25	5.78
Val. Min	7.30	3.39	1.75	20.00	6.10	10.00	7.80	40.00
Val. Max	8.60	4.39	2.15	25.00	7.05	20.00	8.55	61.00
Skewness	0.79	-0.16	0.79	-0.40	0.91	0.34	0.46	0.29
Kurtosis	1.03	-1.90	0.55	-0.70	0.12	-0.65	-1.12	-0.68
Mode	7.60	3.50	1.75	24.00	6.30	12.00	7.80	50.00

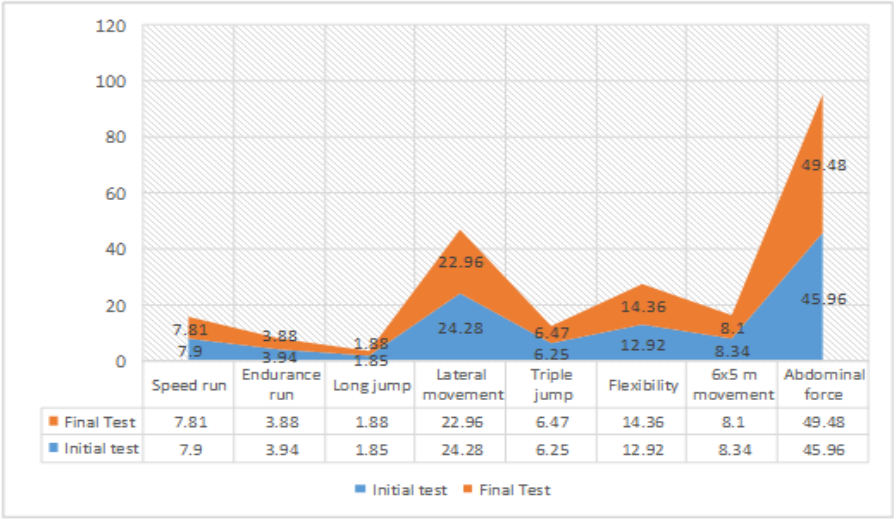

Figure 1. Differences between initial and final motor evaluation

DISCUTIONS

In order to fulfill the objectives of the paper as well as to verify the general hypothesis and the working hypotheses, we aimed at two categories of control tests:

a) control tests aimed at the effects of playing volleyball on some elements of the general motor capacity;

b) specific control tests;

The results obtained from the measurements were analyzed in both the initial test and the final tests based on the arithmetic mean as the main parameter of comparing.

The correlations made based on this parameter highlight the following:

In the 50 m running test, the arithmetic mean of the final test (7.81 sec) is with 0.09 seconds better than the initial test (7.90 sec). The progress made can be considered normal for this age level and is an effect of the improvement of the indices of manifestation of reaction speed, movement

and repetition, at the same time and of the activities foreseen in the specific learning unit, with emphasis on strengthening the start technique, launch from start, speed step and finish.

In endurance running at a distance of 1000 m. The progress made by students between the two tests (initial test 3.94 and final test 3.88) was 0.06 seconds, a consequence of the contents used for the development of aerobic cardiovascular endurance and the improvement of the technique of performing this test.

At the jumping in length from the spot. This test was used to know the indices of force manifestation in speed regime, the progress between the two tests being 0.03 cm, due only to the improvement of force indices in speed regime but to the technique of execution of this test.

Regarding lateral movement it was registered a progress of 1.32 sec from the initial test (24.28 sec) to the final test (22.96 sec).

At the triple jump test was registered a 22 cm improvement from the initial test (6.25 m) to the final test (6.47 m).

At the flexibility test it was registered an initial value of 12.92 cm compared with the final test were we registered a 14.36 cm performance with a 1.44 cm improvement.

In the 5x6 m movement we obtained an improvement of 0.24 sec from the initial test (8.34 sec) to the final test (8.10 sec).

At the last test, the abdominal force test, we registered a value of 45.96 rep at the initial test compared with the final test were we registered a value of 49.48 rep with a progress of 4.48 rep.

CONCLUSIONS

The conclusions of our research highlighted the importance of introducing specific volleyball game means in the physical education lessons for developing motor qualities and also for fulfilling the lessons objectives and obtain a well developed body.

Also volleyball game can be a fun mean for childrens learning process, building cohesion, improving communication, developing body functions and motor qualities.

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OPTIMIZING THE PERFORMANCE OF JUNIOR SWIMMERS BY DEVELOPING GENERAL STRENGTH

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Abstract: Swimming is a cyclical sport branch and through its practice, children benefit from the harmonious development of motor qualities and skills. In order to learn the styles of swimming, the improvement of motor qualities is necessary, of which the most important are: reaction speed, coordination of body segments, explosive force and endurance. Swimming can be done by children from an early age and they can get sports performance very early. From the age of 6 or 7 children can start sports training and the progress of results depends on the quality of training done at an early age. The physical effort made in swim training acts on the body by stimulating the cardio-respiratory system and blood circulation, thermoregulation and organ function in tissues and cells. The aim of this study was to obtain sports performance by streamlining the capacity for physical effort performed based on the development of motor qualities: endurance, speed and strength. Objectives. In the practical application made on students aged 10-11, we pursued the following objectives; identifying the most important and accessible ways and means to obtain valuable results for increasing the performance of athletes; knowledge in the efficiency of development methods of specific motor qualities, especially the muscular force of swimmers. Methods. The methods used in this study were: observation method, practical application, statistical method, graphical representation and data interpretation method. Results. The implementation of the stepped working method for the development of swimmers' strength during the practical application to the experimental group, confirmed the hypothesis and the superiority of this method compared to the training program carried out by the control group can be highlighted. Conclusions. In the development of juniors' strength, an important place is occupied by exercises with weights, even with high demands. It should be noted that the application of the most effective methods in strength training by lifting weights must have a prior foundation made built a correct combination of volume and intensity of effort and adequate recovery.

Key words: strength, training, stepped method,

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INTRODUCTION

In order to obtain outstanding sports performances in any of the sports branches, it is necessary to rationalize the entire training process, in accordance to the requirements established for each training stage (Bitang, 2009). Depending on the inclusion of means and methods in the training plan, the capacity of athletes in preparation for performance, material and financial resources available, the application of the most modern knowledge on the methodology of specific physical effort, performance can take different aspects and forms (Loveless et al., 2010). The studies undertaken and the experience of the coaches in obtaining the sports performances pulled the scientific research in the field of sports towards an applied scientific research, in which from many fields a transfer of knowledge from and to other sciences was made.

Many elements are involved in compiling a training plan, which includes special and general physical training, technical, tactical and psychological training (Dragnea et al., 2002). A system is created which is based on the scientific, methodological and organizational study appropriate to the training process and which will allow the correct combination of all types of training, in order to obtain maximum sports performance.

Physical training is a process that aims to develop basic physical qualities. Learning to swim is done from an early age and talented children will start continuous training on a scientific basis as early as possible but not before the age of 7-8 years.

"The assessment of swimming effort is made according to distance and time, to establish and assess the effort according to basic principles such as: specificity of effort, progressivity and overload, which also bring important changes in training preparation methodology" (Marinescu, 2003)

Specialists in the field recommend workouts with high volume of effort and also with high intensity (Ignat, 2006). For the young age categories, methodical means for training young swimmers were created and made available to coaches by the Romanian Swimming Federation.

Swimming includes several sports events, from 50 m swimming races to 1500 m events. For the performance of these races, athletes need to develop motor skills, such as endurance, strength, speed, coordination of movements and flexibility (Marinescu et al., 2010). They can be developed and improved both during training at the swimming pool and during training at the gym.

The most important physical qualities of a swimmer are speed and endurance, which are closely related to the development of strength.

The physical effort in the water is achieved by propulsion acting on the water through the movements of the lower limbs. The maximum muscle strength of these segments acts on the water and the more optimal the muscle fibers for the effort, the better the propulsion efficiency.

The development of muscle strength ensures balance of the body during the effort maximizing the movement through water with great precision and speed (Guyton, 1996).

Strength is the ability of an athlete to overcome external resistance or to resist through muscular effort.

It is known that swimming speed depends primarily on the distance traveled. At the root of the development of strength is power (Mcleod, 2010). In competitions we can see quite often how, after the swimmer has started a distance with a good technique, he gradually shortens his race or slows down, which leads to a decrease in speed. If muscle group fatigue is combined with a relatively rapid recovery of heart rate through good functional training, this results in insufficient local strength.

To develop strength, training includes (Groza, 2015): general strength development exercises for the muscles of the neck, arms, torso, legs, jumping, throws, exercises with weights from the age of 11 years.

Physical training on land uses exercises that involve muscle groups (Ifrim, 1986) used in swimming and that mimic the movements in the water, with high amplitude, with a sustained work

rhythm, and sports equipment will be used predominantly from a lying position. Mobility and stretching exercises are very important in warming up and training (Gatta et al., 2012).

In swimming, the basic motor qualities, which determine the obtaining of sports performances, are manifested in a combined form and not too simple, a form determined by the specifics of the test and the respective procedure.

The initiation of some experimental training stages can highlight the superiority of some working methods in relation to the age of the athletes and to the training period. This would allow in the future the elimination of inefficient elements from physical training and better management of training time.

THE AIM OF THIS STUDY

The aim of this study is to increase the performance of junior swimmers by developing muscle strength that will improve and optimize the performance of swimmers in training and competitions.

The objectives pursued in the research are:

Application of some physical development programs, which aim mainly at the motor qualities of strength and power, in order to improve the sports performances;

Establishing the content and structure of the experimental program for physical training of swimmers;

Elaboration and introduction in the training plan of some special physical training programs in the training of swimmers;

Elaboration and introduction in the training plan of some special physical training programs in the training of swimmers;

RESEARCH HYPOTHESIS

If the physical training occupies an important place in the training process, then the technical executions are not mastered correctly only in the conditions in which a solid physical support is achieved.

Thus, if we use for the development of strength in the process of stepwise increase of effort, we consider that we will obtain better values of strength indices than through other methodical procedures.

SUBJECTS AND PRACTICAL APPLICATION

The practical application was carried out on a number of 15 female swimmers in a group of the 4th grade at the Emil Racoviță National College, Bucharest.

Eight swimmers (the experiment group) of the 15 athletes perform strength training exercises in a six week step-by-step growth process.

The other group of seven athletes (the control group) use two programs for the same amount of time: power training and the circuit work method.

Swimmers performed a specific training 3 times a week (Monday, Wednesday and Friday).

The training program for the development of general strength includes the following exercises: bicep flexions, throws with the medicine ball (2 kg), knee bends, vertical brace, half-bends, dumbbell lifts, pushed lying down, horizontal brace and exercises for the abdomen at an inclined plane.

The tests to which the swimmers were subjected to verification were:

Test 1. - Speed running with standing start on the distance of 30 m (sec);

Test 2. - Vertical leap (cm)

Test 3. - Long jump without momentum on two legs (m);

Test 4. - Triple jump without momentum (m);

Test 5. - Overhead throws with two arms - medicine ball 2 kg.
Test 6. - Forward throws with two arms - medicine ball 2 kg;
Test 7. - Knee flexion - kg;
Test 8. - Pushed lying down - kg.

The methodical variant of step work used was done with two repetitions with the same load of 60% - 60%; 65% - 65%; 70% - 70%; 80% - 80%.

RESEARCH METHODS

The following methods were used for our research: the method of studying the specialized bibliography through which the theoretical substantiation will be performed, the observation method applied throughout the research activity, the experimental method or the practical application that will provide an objective basis to respond to the hypotheses and the statistical-mathematical method of data processing and interpretation (Gagea, 1999).

RESULTS

The experimental program for the development of swimmers' strength was applied for six weeks, three times a week and the testing through control tests was done before and after the experiment. For a better visibility and clarification of the results obtained, we recorded the data obtained and the averages of the experiment group and the control group.

Table 1 shows the averages of the test results of the experimental and control groups and the control group at the initial and final tests.

In Figure 1 are the averages of the two groups of results obtained in the initial test and final test. We see from the graph that the experimental group obtained better final results compared to the control group. It is highlighted in figure 2, particularly good results obtained from tests 2, 7 and 8.

Figure 3 shows the progress at the end of the differences between the two groups of tests. In these tests: 2 which represent vertical relaxation, 7 which represent knee flexion and 8 which represent the push-and-lie test, the experimental group made much more important progress compared to the control group. These data prove that the means used and the training plans during the practical application were good and in terms of working method it can be highlighted the superiority of the step work method.

Table 1 Average of the results at the initial test (IT) and the final test (FT) of the experimental group (EG) and of the control group WG)

Control samples	*Experiment group*		*Control group*		*Difference in progress*	
	Initial testing	Final testing	Initial testing	Final testing	EG	WG
Test 1. speed running with standing start on the distance of 30 m (sec);	5.82	5.50	5.85	5.74	0.32	0.11
Test 2. - vertical leap (cm)	26	31	25	26	5.0	1.0
Test 3. - long jump without momentum on two legs (m);	1.25	1.36	1.26	1.28	0.11	0.02
Test 4. - triple jump without momentum (m);	5.24	6.20	5.10	5.35	0.96	0.25

Test 5. - Overhead throws with two arms - medicine ball 2 kg/m.;	4.70	5.25	4.75	4.80	0.55	0.05
Test 6. - Forward throws with two arms - medicine ball 2 kg/m.;	3.70	4.60	3.65	3.72	0.90	0.07
Test 7. - knee flexion - kg;	27	41	28	32	14.0	4.0
Test 8. - Pushed lying down - kg.	25	35	25	30	10.0	5.0

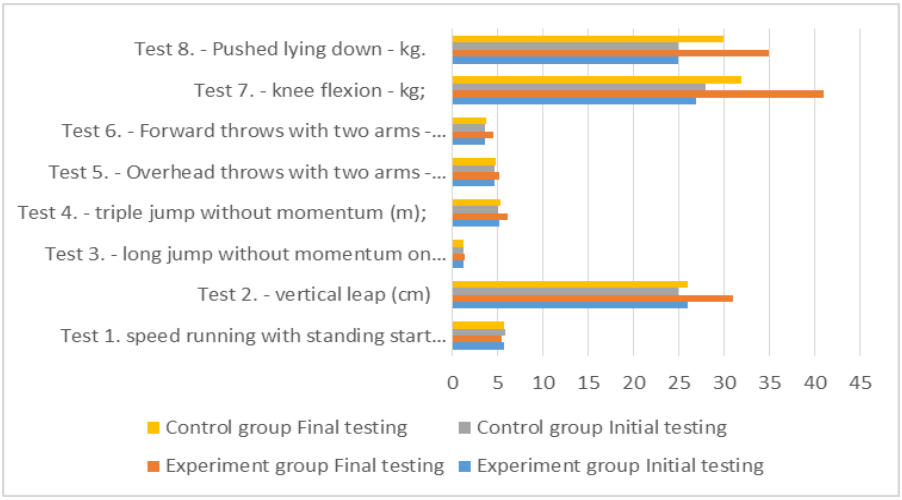

Figure 1 Average results of the control samples

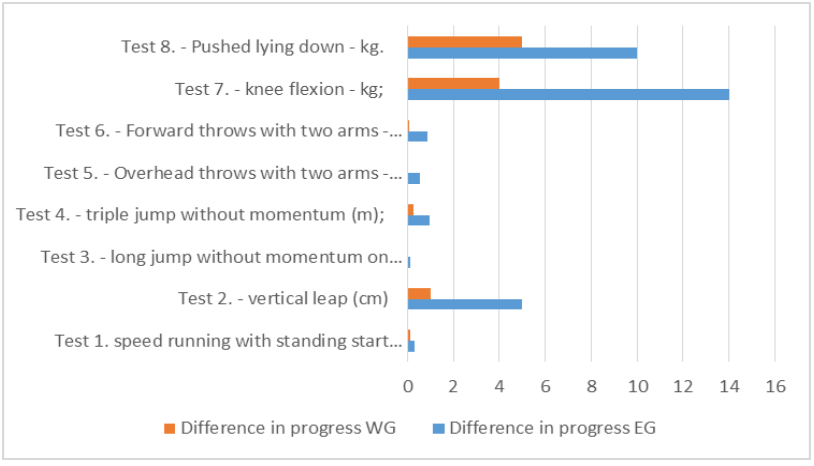

Figure 2 Progress of the groups between the two tests

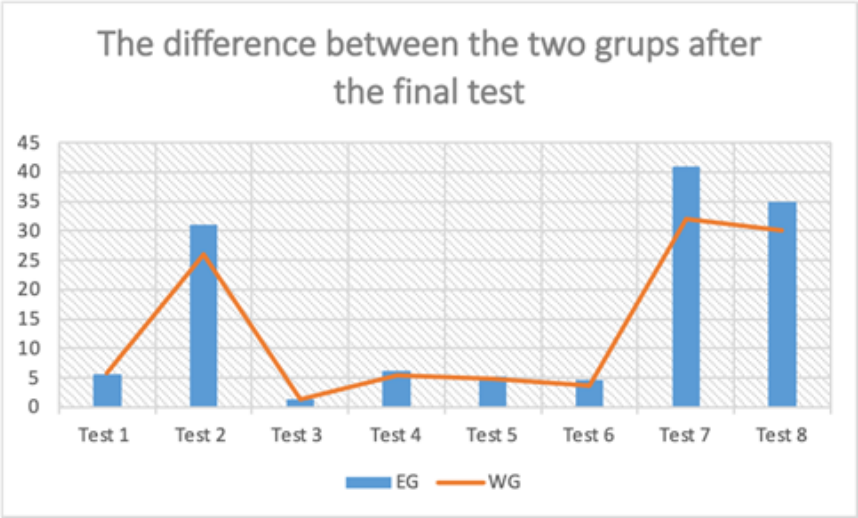

Figure 3 Differences in progress of the two groups

CONCLUSIONS

In the development of junior strength, an important place is occupied by exercises with weights, even with high demands. It should be noted that weight training should be based on a correct combination of effort volume and intensity and proper recovery.

The obtained results underline the importance of using strength training through the process of increasing weight in steps, which after six weeks of training had beneficial effects, in the sense of improving the muscular strength of swimmers and implicitly sports performance.

Athletes from both groups progressed but the most important developments were the swimmers from the experimental group who participated in the study.

Thus, the results obtained from the tests performed entitle us to conclude that the proposed hypothesis has been confirmed.

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ASPECTS REGARDING THE DEVELOPMENT OF MOTOR QUALITIES THROUGH DYNAMIC GAMES AND RELAYS IN PHYSICAL EDUCATION LESSONS IN PRIMARY SCHOOL

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Abstract: The development of explosive force for the lower limbs and the acceleration speed constitute major objectives of the school's curriculum for the primary school students. The objective of our research was to emphasise the way in which proper usage of dynamic games and relay races with jumping and running content influence, at the primary school level, the development of motric qualities. The experiment took place at the „Iosiv Vulcan" National College from Oradea during the physical education classes. We had 103 subjects, 54 in experimental group and 49 in control group, girls and boys. The 10 weeks of the experiment were divided for methodological reasons into two cycles of 5 weeks each. Evaluation of acceleration speed and agility: 20 meters with foot start, 4x5 meter shuttle with foot start, "Foot taping test" and "Agility test". The activity submitted during this experiment led to a much better progress in all control tests, in favor of the subjects in the experiment group, which confirms the efficiency of the activity performed.

Key words: dynamic games, motric qualities, Physical Education

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INTRODUCTION

Exercises and sport are an important part of childhood. The lessons learned form physical education lessons are applicable throught life. The development of explosive force for the lower limbs and the acceleration speed constitute major objectives of the school's curriculum for the primary school students. Children who establish regular exercise habits will ideally continue them

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in adulthood (Benjamin and Glow 2003; Peitz et al. 2018). As an indispensable factor for success in physical education activities, games and other physical activities, basic motor skills in childhood are determinant for a healthy and active lifestyle.(Cermak et al. 2015). On the other hand, physical inactivity in childhood may result in the inability to acquire and develop motor skills and abilities, which leads to posterior deficit in learning and in the perfection of specialized motor abilities (Gallahue et al. 2013). More than just a chance to have fun, play is serious business when it comes to a child's health and development. Despite its many benefits, statistics show that the amount of time children get to play has been declining for decades. Tightly structured family and school schedules, more parents working outside the home, fewer safe places to play, and rising media use and screen time are among the reasons (Zghal et al. 2019; Cristea et al. 2002).

Some variables make it difficult to practice physical activity in school environments, such as: limited time, large number of students per class and lack of adequate spaces. Besides, throughout the years there has been a change in the behavior of children, leading to the removal of games that involve the movement of several body segments, and to the approximation with technology and entertainment using a screen. Facing this phenomenon, new strategies are required to keep the children motivated for the practice of physical activity (Finco et al. 2015; Cristea and Sabău 2017) Dynamic games can contribute to increasing efficiency, motivation in the development of motor skills among children. Dynamic games is a form of practicing predominantly emotional physical exercise, performed spontaneously or organized according to predetermined rules, for recreational purposes. At the same time, play is a way of adapting the child to social reality

The insertion of dynamic games in the physical activity help children and adolescents to reach the recommended levels of physical activity, and, probably, have a positive impactive on the lives of children, since this is a useful way to acquire and develop motor skills and abilities. (Medeiros et al. 2017)

In this context, in this study we analyze the literature as to the efficacy of the use of exergames in Physical Education classes and in the acquisition and development of motor skills and abilities. We organized educational games for all activities, at any time, depending on the objectives, considering them valuable means of learning. Knowing that the game is a form of organization, method and procedure, we often used the interactive methods, considering them games with multiple formative-informative valences that affect the child's mind and personality. The objective of our research was to emphasise the way in which proper usage of dynamic games and relay races with jumping and running content influence, at the primary school level, the development of motric qualities.

HYPOTHESIS

The proper usage of dinamic games and raley races containing jumps and runs during the phisical educatin classes at the primary school level will determine a significant growth in the manifestation index of the acceleration speed and explosive force of lower limbs. The judicious application of those means and methods requires (at our subject's category) the usage of maximal intensity, complete recovery breaks and the motivation of the subjects.

SUBJECTS

Our experiment took place at the „Iosiv Vulcan" National College from Oradea during the 2019-2020 school year. Considering the fact that our subject are primary level students we random draw two parallel classes, second and third grade. Also by random draw we chose at each grade an „experiment class" and a „control class". By these means we obtained an experiment group (made of the second grade class A and third grade class B) and a control group (made of second grade class C and third grade class A). The experiment group contained 48 subjects (25 girls and 23

boys) from the second and third grade, 8-9 years old. Initially, when we started the experiment the number of the subjects were 54, but during the development of the experiment some of the subjects weren't able to paticipate at the whole experiment and take both tests (because of the poor health condition or unknown reasons). The control group was made of 49 subjects (24 girls and 25 boys) from the second and third grade, same age as those from the experiment group.

MATERIALS AND METHODS

The experiment took place at the „Iosiv Vulcan" National College from Oradea during the physical education classes where we benefited from our collabortion with H.S. teacher. „Iosiv Vulcan" National College, Oradea has good material conditions for the efficient conduct of physical education lessons. Our experimet lasted for 10 weeks preceded by one week in which the initial test was performed and followed by another week allocated to the final test.

The 10 weeks of the experiment were divided for methodological reasons into two cycles of 5 weeks each. During the experiment I intervened directly in 40 physical education lessons (20 lessons for each of the two classes from the experiment group). The period of the experiment was chosen so as to be consistent with the class curriculum. The classes that make up the control group continued their work as usual. From an organizational point of view, the physical education lessons presented the following structure: the organization of the group of students (1-2'), the preparation of the body for effort (10-12'), the development of acceleration speed and agility (15-18'), the development of the explosive force of the lower limbs (12-15'), the recovery of the body after effort (2-3') and the organized end of the lesson (1-2'). The same organizational structure was used for the experimental group, excepting the means used which consisted exclusively of dynamic games and relay races with jumping and running content.

In the case of the experiment group, in the first of the two cycles of five weeks that made up our experiment we chose to use in the first physical education lesson of the week 3 dynamic games with running content and 2 relay races with jumping and running content, and in the second physical lesson of the week we used 3 dynamic games with jumping content and 3 relay races content with running content.

We did the same in the second 5-week cycle, with the amendment that the means used (dynamic games and relay races) were changed to bring new types of exercises for children, but not before producing an adaptive reaction to the exercises used in the previous cycle.

We chose to repeatedly apply the same means during the 10 physical education lessons in a training cycle, to ensure that all children learn the specific rules and can participate with maximum physical and mental involvement so that the goals set can be met. Without maximum involvement, the development of speed and explosive force cannot be achieved.

Given the characteristics of the developmental stage of the subjects, we did not make any specific dosage for girls or boys. For the same reason, given the comparable results between boys and girls, we chose not to use the division by sex for the statistical interpretation of the results obtained.

Table 1. Weekly distribution of the used means

Cycle	*First lesson of the week*	*Second lesson of the week*
I	3 dynamic games with running content 2 raley races with jumping content	3 dynamic games with jumping content 3 raley races with running content
II	3 dynamic games with running content 2 raley races with jumping content	3 dynamic games with jumping content 3 raley races with running content

In order to obtain a more objective evaluation of the activity carried out, we decided to apply a system of control tests, the measurements performed by us on the subjects can be grouped in two categories:

Evaluation of acceleration speed and agility: 20 meters with foot start (20 m.), 4x5 meter shuttle with foot start (4x5 m) and "Foot taping test" (F.tapind) and "Agility test" (Agility) and evaluation of acceleration speed and agility: 20 meters with foot start (20 m.), 4x5 meter shuttle with foot start (4x5 m) and "Foot taping test" (F.tapind) and "Agility test" (Agility), evaluation of the explosive force of the lower limbs: long jump without momentum (S.l.j.) and "Sargent Test" (Sargent).

RESULTS

The activity submitted during this experiment led to a much better progress in all control tests, in favor of the subjects in the experiment group, which confirms the efficiency of the activity performed.

Table 1. The arithmetic mean of the results recorded, in the control samples used, by the subjects from the 2 groups in each of the 2 tests and the progress between them (expressed as a percentage and by means of the effect size)

Test	***Experimental group***				***Control group***			
	T.I.	***T.F.***	***Progress***		***T.I.***	***T.F.***	***Progress***	
			(%)	***ES***			***(%)***	***ES***
20 metri standing start *(s.)*	4,55 ±0,38	4,42 ±0,27	2,86	***1,02***	4,49 ±0,33	4,44 ±0,41	1,11	***0,58***
The shuttle 4x5 metri *(s.)*	9,87 ±0,63	9,64 ±0,47	2,33	***0.83***	9,91 ±0,57	9,83 ±0,55	0,81	***0,54***
Foot taping test *(nr.)*	61,83 ±6,78	64,05 ±6,02	3,59	***0,94***	61,04 ±7,32	62.92 ±8,11	3,08	***0,63***
Agility test *(s.)*	11,73 ±0,58	11,52 ±0,41	1,79	***0.91***	11,78 ±0,49	11,69 ±0,56	0,76	***0,77***
Standing long jump *(cm.)*	126,32 ±12,26	136,54 ±11,68	8,09	***1,05***	124,91 ±12,08	132,78 ±12,37	6,30	***0,86***
Sargent test *(cm.)*	23,96 ±3,38	26,77 ±3,05	11,73	***0.90***	22,88 ±3,32	25,04 ±3,44	9,44	***0,71***

We chose to highlight the progress between the two tests in each group involved in our research through two indicators: the difference between the arithmetic means of the performances recorded, in the control samples used, by the subjects from the 2 groups (experimental and control) in each of the 2 tests (initial and final), expressed in percentages (%) and by means of the effect size (ES) which referring to Thomas J.R., et al (1996) represent the standardized difference

between the arithmetic means of the performances recorded, in the control samples used, by the subjects from the 2 groups in each of the 2 tests.

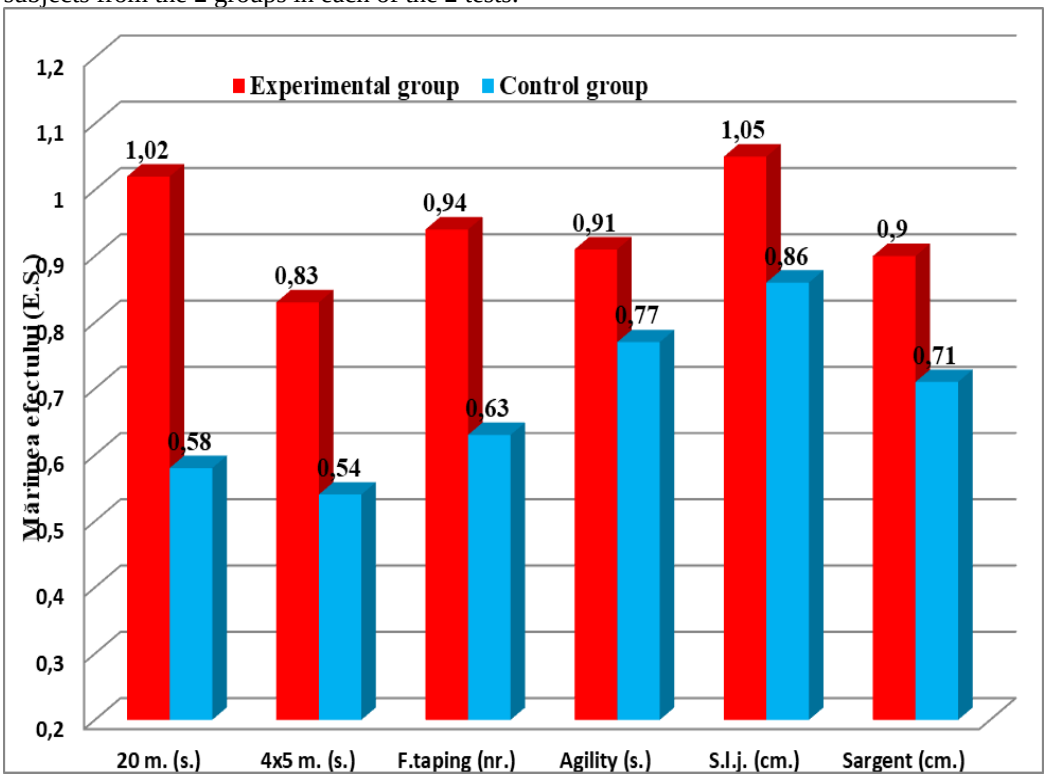

Figure 1. Effect size calculated for each control sample in the two groups of subjects

We can see a difference in all the tests applied in favor of the experiment group, the experiment group evolved in all tests compared to the control group.

CONCLUSIONS

The obtained results confirm the research hypothesis.

An important goal of physical education teachers is to increase students' motivation and interest in the systematic participation of physical activities. We believe that dynamic games and relay races can successfully fulfill this goal, while obtaining some attractive and enjoyable lessons for students.

Also, through our approach we wanted to emphasize the fact that if these dynamic games and relay races with running and jumping content are correctly chosen and properly dosed can significantly contribute to increasing the manifestations of the two motor qualities mentioned.

Another conclusion that emerges from the values recorded in the control tests and the progress made by the experiment groups, both girls and boys, confirms the efficiency of the activity performed. The development or the increase of some indicators of various manifestation forms of the explosive force and the acceleration speed, determines us to support the efficiency and the design of the didactic approach in the physical education lesson.

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ANALYSIS OF THE EDUCATIONAL PROCESS IN TEACHING PHYSICAL AND SPORTS ACTIVITIES COLLECTIVES FOR SECONDARY EDUCATION UNDER THE COMPETENCY APPROACH

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Abstract: This study aimed to analysis the educational process in teaching physical and collective sports activities for secondary education in light of the competencies approach, where we used the descriptive analytical approach. The study was conducted on a sample of 206 teachers of physical and sports education working in some high schools in the Algerian region using a questionnaire network. We have come to say that the educational process in teaching collective physical and sports activities is based on educational goals and procedures and evaluation; and through this, the material of physical and sports education becomes a leading role as a result of developing the performance of teachers, and therefore this offering can be considered as a way to reform educational systems through the reform of educational materials.

Key words: Educational proces, teaching, competency approach, activities collectives.

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INTRODUCTIOn

The school is an educational institution which contributes to the education of the individual and helps him to grow in all aspects of his physical, psychological, mental, spiritual and social personalit. It also helps to develop the will of individuals and to correctly orient their preferences and desires; and modify their behavior and provide them with expertise and skills to help them adapt to the society in all areas. In order to properly prepare the individual, the school as an educational institution must provide a different set of study materials and educational programs. Among the academic subjects, we find physical education and sports because it is considered as an integral part of general education which aims to prepare the appropriate citizen for physical, mental, emotional and social aspects through the colors of activity chosen to achieve these characteristics (Harshaoui et al. 2011). It is an essential element of the Algerian education system, and one of the milestones of education which aims to prepare the student physically, psychologically and mentally in perfect balance (Ben Saber et al. 2017). Through which the professor seeks to achieve the existing goals, whether they are in the physical skill or cognitive

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domain (Zubaysh et al. 2020). In the light of the fundamental changes that the Algerian education system has undergone linked to the development of programs, the so-called skills approach has become an organized educational process through which the teacher works to place the learner in front of several posts. The learner uses their tribal gains in knowledge, skills and competence (Fatima Al-Zahra Sadig 2014). It is a new formulation of educational goals based on the teacher's skill in building the goal, known as educational behaviors (Kroum 2010). As physical education and sports teachers and our desire to raise awareness in the field of teaching physical and sports activities, it was necessary to analyze teaching phenomena in the form in which they exist in the education system, and in their association with various institutional and educational conditions. As far as teaching is concerned, it includes all the conditions and capacities that the teacher provides in a specific teaching situation (Harbash 2013). Given the fact that this subject is unique in its nature compared to other subjects, we decided to throw our current study on analysis and try to dismantle the teaching of collective physical and sports activities and, as a result from this, several directions appeared to us, including we began to seek the correct way by which the educational process in the teaching of physical activities and sports for secondary education , And given that this subject is unique in its nature compared to the other subjects, we decided to throw our current study on the analysis and to try to dismantle the teaching of the physical and sports collective activities. As a result of this, several trends have emerged for us, among which we have sought to seek the correct way in which the educational process is conducted in the teaching of physical and sports activities for secondary education. It was necessary to look for an appropriate way to analyze these practices, because the analysis depends on reference models which allow a rational reading of the facts and based on the reference models for the analysis of the educational process as a model of pedagogical analysis. from the Dutch researcher Van Gelder (1965). Educational activity analysis model by Suarez (1985). Clazire presented her model which integrates the two models and simplifies the basic concepts of very complex educational work and highlights the elements necessary in their mutual relationship. This is what Drig Muhammad does in his book The Analysis of the Educational Process and Teacher Training (Al-Dorij mohammed, 2004), And based on studies such as the Center for Teacher Training at the University of Florida (1985), which is considered one of the serious studies in the analysis and identification of educational skills, And the study by Jack Noel (1997), entitled Analysis of educational practices, is an ethical and symbolic framework for educating the point of view of a teacher, A study by Rochelle Davis (2000) on the teacher evaluation system at Montgomery prepared by the researcher developed by the Maryland Commission in the context of programs known as the year "The Search for Better Teaching" (2010) in the United States. United States of America recognizes the importance and complexity of teaching in high performing schools , A study by belQaidum Belkacem (2013) on the educational efficiency of an intermediate teacher, processes and interaction as criteria , And a study by Fatima Zahra Sadiq (2014), The study of Hamdan Salah (2018), The study of Sadiq Khalid Al-Hayek (2018), The study of Bitar Hisham (2020). All these studies have dealt with the subject of the educational process, and on the basis of previous theoretical readings, we have presented the following problem:

Is the educational process in teaching collective physical and sports activities for secondary education in Algeria based on a model?

RESEARCH PROCEDURES

The method used in the research: The two researchers used the descriptive approach.

The sample and its selection methods**:** The research sample included 23% of the research community consisting of 879 professors, to obtain a sample of 206 teachers for physical education and mathematics for secondary education, who were randomly selected.

SEARCH TOOLS

Questionnaire: The researcher used a form (of three grades) prepared by the researcher, Mohamed Al-Saleh Saadawi, and presented it to a group of arbitration professors with specialization to make it appropriate to study what was prepared for him according to the local environment.

Distribution of questionnaires: The questionnaire was distributed to professors during seminars and academic days with the inspectors in some secondary schools in the cities of the western Algeria.

Statistical tools: The researcher used statistical methods using the SPSS statistical program in order to calculate: percentage, iterations, alpha-Krumbach coefficient, standard deviation, The average Arithmetic, quadratic test (Ca2)

View, analyze and discuss the results of the questionnaire as a whole:

Table 1. Clarifies the results of the questionnaire as a whole
(Data source: 12/02/2020)

Number	***The hub***	***Degree of approval***	***standard deviation***	**The average Arithmetic**
01	Goal axis	%88.2	0.2124	2.646
02	Axis of educational procedures	%89.1	0.3548	2.672
03	Calendar axis	%87.2	0.3336	2.617

View, analyze and discuss the results of the questionnaire according to the axes. View, analyze and discuss the results of the first axis linked to the objectives.

Table 2. clarifies the results of the questionnaire as a whole
(Data source: 12/02/2020)

the question	***The average Arithmetic***	***Significance level***	***Degree of liberty***	***Ka2 Calculated***	***ka2 schedule***	***Degree of approval***	***Significance***
01	2.43			101.282		%80.9	
02	2.69			150.184		%89.8	
03	2.86			274.291		%95.5	
04	2.43			86.515		%81.1	
05	2.88			118.136		%96.0	
06	2.87			279.505		%95.8	
07	2.35	0.01	2	90.913	5.99	%78.3	Means
08	2.48			91.379		%82.5	
09	2.38			80.981		79.4	
10	2.88			284.107		%96.0	
11	2.62			118.961		%87.2	
12	2.83			89.786		%94.3	
13	2.59			111.184		%86.4	

View, analyze and discuss the results of the second axis linked to the pedagogical procedures:

Table 3. Clarifies the results of the second axis (educational procedures)
(Data source: 12/02/2020 **)**

the question	*The average Arithmetic*	*Significance level*	*Degree of liberty*	*Ka2 Calculated*	*ka2 schedule*	*Degree of approval*	*Significance*
14	2.45			101.282		%81.6	
15	2.46			150.184		%81.9	
16	2.51			274.291		%83.7	
17	2.90			86.515		%96.6	
18	2.59			118.136		%86.2	
19	2.69			279.505		%89.6	
20	2.66			90.913		%88.5	
21	2.40	0.01	2	91.379	5.99	%79.9	Means
22	2.75			80.981		%91.7	
23	2.50			284.107		%83.3	
24	2.93			118.961		%97.7	
25	270			89.786		%90.0	
26	2.71			111.184		%90.3	
27	2.75			182.019		%91.6	
28	2.82			235.757		%94.0	

View, analyze and discuss the results of the third axis linked to evaluation:

Table 4. Clarifies the results of the third axis (evaluation)
(Data source: 12/05/2020**)**

the question	*The average Arithmetic*	*Significance level*	*Degree of liberty*	*Ka2 Calculated*	*ka2 schedule*	*Degree of approval*	*Significance*
29	2.86			109.223		%95.5	
30	2.69			147.796		%89.6	
31	2.70			158.456		%90.1	
32	2.55			94.495		%85.0	
33	2.60	0.01	2	110.456	5.99	%86.6	means
34	2.38			88.379		%79.4	
35	2.44			86.049		%81.4	
36	2.60			110.573		%86.6	
37	2.75			189.33		%91.7	
38	2.45			72.01		%81.7	

DISCUSS THE RESULTS

Through the results of the first axis of the questionnaire, we concluded that the educational process of teachers of physical and sports education in teaching physical and sports activities collective for secondary education in Algeria is based on objectives ; With an average score of 2,646 and a very high approval score of 88.2% ; this is due to the fact that teachers have constructed and formulated objectives ; starting with diagnostic assessment and indicators ; Where these results were consistent with the results of the Asiri study in (2001) under the title "The extent of the importance of the pedagogical skills required for physical education teachers at Riyadh

college; And the study of Mohammed Al-Draij in (2004) under the title of analysis of the educational process and teacher training**.** Through the previous presentation to discuss the results of the first hypothesis, it is clear that this hypothesis indicates that the educational process in teaching collective physical and sports activities for secondary education in Algeria is based on the objectives.

Through the results of the second axis of the questionnaire, we concluded that the educational process of teachers of physical and sports education in teaching physical and sports activities collective for secondary education in Algeria is based on Educational procedures and achievements. With an average score of 2.672 and a very high approval score of 89.1%; This is due to the use of teachers in teaching group physical and sporting activities for very acceptable educational procedures and achievements represented in appropriate methods and methods and appropriate strategies such as cooperative learning strategy and problem solving strategy; Where these results were consistent with the results of the Asiri study in (2001) under the title "The extent of the importance of the pedagogical skills required for physical education teachers at Riyadh college; And the study of Mohammed Al-Draij in (2004) under the title of analysis of the educational process and teacher training; A Mauban study at Cherbrooke University in Geneva in 2009 under the title Professional educators: a new perspective on the analysis of teaching practices, Through the previous presentation to discuss the results of the second hypothesis, it is clear that this hypothesis indicates that the educational process in teaching collective physical and sports activities for secondary education in Algeria is based on the Educational procedures and achievements.

Through the results of the third axis of the questionnaire, we concluded that the educational process of teachers of physical and sports education in teaching physical and sports activities collective for secondary education in Algeria is based on evaluation; With an average score of 2.617 and a very high approval score of 87.2%; This is the result of the great role that teachers give to the evaluation component, starting with diagnostic evaluation, since formative evaluation as a process evaluation is in line with the educational process and indicators, and finally at the end of the periodic unit ; Where these results were consistent with the results of the Asiri study in (2001) under the title "The extent of the importance of the pedagogical skills required for physical education teachers at Riyadh college; And the study of Mohammed Al-Draij in (2004) under the title of analysis of the educational process and teacher training, through the previous presentation to discuss the results of the third hypothesis, it is clear that this hypothesis indicates that the educational process in teaching collective physical and sports activities for secondary education in Algeria is based on the evaluation.

CONCLUSIONS

In discussing the results of the first partial hypothesis, we have come to say that the educational process in teaching collective physical and sports activities for secondary education in Algeria is done on the basis of the objectives.

In discussing the results of the second partial hypothesis, we have come to say that the educational process in teaching collective physical and sports activities for secondary education in Algeria is done on the basis of the Educational procedures and achievements.

In discussing the results of the third partial hypothesis, we have come to say that the educational process in teaching collective physical and sports activities for secondary education in Algeria is done on the basis of the evaluation**.**

Aknowlegments

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