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RELATIONSHIP BETWEEN MOTOR SKILLS AND BODY COMPOSITION AMONG MIDDLE SCHOOL STUDENTS FROM BIHOR–HAJDÚ-BIHAR EUROREGION

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Abstract: Body composition represents an important component of motor skills and health among children. According to studies an excess of adipose tissue can contribute to the decrease in performance when it comes to sprinting, endurance running, jump tests or several other sports games. The goal of this study is to determine the motor skills and the body composition of middle school students from Bihor–Hajdú-Bihar Euroregion and to present the results of the motor tests separately for subjects with a normal percent of adipose tissue and for subjects with an excess of adipose tissue. The study included 934 subjects aged 10-15, and it used the anthropometric method to determine height and weight, and the bioelectrical impedance analysis to determine the percent of adipose tissue. Motor skills were determined using 9 motor tests of the Eurofit Test Battery. The results of the measurements were statistically processed with the SPSS software. The classification of the body mass index and of the percent of adipose tissue was performed based on orientative standard values taking into consideration the subjects' age and gender. The mean values of the motor tests were calculated separately for subjects with a normal percent of adipose tissue and for subjects with an excess of adipose tissue. Out of the total sample group 21.5% had their percent of adipose tissue below the normal values (8.8% BH; 12.7% HB); 49.9% had normal values (27.3% BH; 22.6% HB) and 28.6% (girls=117; boys=150) had an excess of adipose tissue or were obese (14.67% BH; 13.92% HB). There is a significant relation between body mass index and the percent of adipose tissue ($r = 0.781$, $p < 0.001$, CI = 95%). Students with normal percent of adipose tissue obtained better results than those with an excess of adipose tissue at seven (girls) – eight (boys) motor tests.

Keywords: motor potential, body composition, adipose tissue, middle school students

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INTRODUCTION

According to World Health Organization (2013), obesity is recognized as a major and independent risk factor. One in three children in Europe is overweight or obese and within the last 30 years obesity rates have doubled among children. Maintaining an ideal weight and body composition throughout school years should be a national priority in Romania.

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As stated by Rauner et al. (2013), the cause of the increase of adipose tissue and decrease of motor skills should be sought in the changed lifestyle which results in insufficient physical work among children in their adolescence, a period of growth and development, especially due to the lack of physical exercises.

Children and teenagers prefer the television, video games, computergames and mobile phones and they have an imbalanced nutrition because of the excess ofsweetened soft drinks, saturated fats and fast-food type of foods (World Health Organization, 2013).

According to Pařízková (2014), in most cases overweight or obese students have a reduced cardiorespiratory capacity (VO_2max) in case of maximal effort on the treadmill or on the bicycle ergometer.

The excess adipose tissue (AT) was associated in a negative way with the standing broad jump test and with the bent arm hang test (Kruger et al. 2006). Hypokinesia and a weakened physical condition may cause health problems and the increase of the number of medical treatments (Bovet et al. 2006). It is recommended to identify the teenagers within the sample group in order to prevent them from becoming obese in their adulthood (Jerum & Melnyk, 2001).

In order to determine body composition there were used anthropometric methods like: calipermetry, calculating the fat-free mass based on measuring some perimeters of the body or based on height and body weight, calculating total body water based on height and body weight, or other methods like: hydrodensitometry, DEXA (Dual Energy X-ray Absorbtiometry), bioelectrical impedance analysis (BIA), tomodensitometry X, nuclear magnetic resonance (NMR), infrared spectroscopy (Near Infrared Interactance), etc.

The analysis of body composition by BIA is considered an efficient method and less expensive. Essentially it is based on the difference between the resistance to the electrical current of the fat-free tissue and of the adipose tissue.

The muscles, blood vessels and bones have high water content and are excellent conductors of electricity. Thus, muscle tissue is a better conductor than the adipose tissue which has a higher resistance to the microcurrent. Based on the electrical conductivity of the tissues, the adipose tissue can be determined exactly. The adipose tissue percent refers to the quantity of AT in relation to the total body weight, expressed in percent (Anonim, 2011).

Body mass index (BMI) is an instrument which represents the standard in the assessment of the risks appeared as a result of excess weight. According to Oswald (2007), in many cases BMI values don't supply information regarding body composition and implicitly, the quantity of AT. Some people may have a high BMI even if they have a low AT level, or have a low BMI and an excess of AT.

In numerous sports it is recommended to have a low level of adipose tissue. The excess AT may contribute to the decrease in performance when it comes to sprinting, endurance running, jump tests or several other sports games. According to Albright & Stern (1998), obesity is defined by the quantity of AT and not by the total body weight.

In 2006 a team of the Health Research Institute of London Metropolitan University drawn up a classification of the AT rate in percentile according to age and gender (McCarthy et al. 2006). This reference curve implies 4 zones: below the normal values; normal values; excess of AT and obesity. These zones were marked by values of 2^{nd}, 85^{th} and 95^{th} percentile. Researchers strived to define a rate similar to the recommendations given by the committees of experts of Centers for Disease Control and Prevention or of the International Obesity Task Force.

OBJECTIVES

The goal of this study was to determine the motor skills and the body composition of middle school students from Bihor–Hajdú-Bihar Euroregion and to present the results of the motor

tests separately for subjects with a normal percent of adipose tissue and for subjects with an excess of adipose tissue

MATERIALS AND METHODS

The selected sample group was made up of middle school students from 50 classes from Bihor–Hajdú-Bihar Euroregion. The measurements were performed with the approval of the Bihor County School Inspectorate, of the schools from the two counties as well as of the parents/guardians of the subjects. The total number of students that participated to the study was 934 out of which 473 were girls and 461 were boys. The measurements took place within the 2014-2015 school year.

Within this study, we used the anthropometric method to determine height, weight and the percent of adipose tissue. In order to determine body composition, the measurements were performed using a height measure (Seca 213 Marsden UK) and an Omron BF511 monitor (Omron Corporation, Kyoto, Japan). Height was measured in cm, the subjects being barefoot and having their heads in Frankfort plane, and weight was measured in Kg. The Omron BF511 body composition monitor uses the BIA method to determine the percent of adipose tissue of the body.

The device measures the resistance to the electrical current of the tissues when a microcurrent flows through them (50kHz. 0.5mA). According to the technical data sheet of the device, the age range for which it classifies the percent of adipose tissue is 6 – 80 years. The value of the AT index is determined based on the resistance of the tissues to the electrical current, on height, weight, age and gender of the subjects. The measuring procedure implied the analysis of the subjects being barefoot, while holding the mobile part of the monitor with both their hands. The analysis lasted about 30 seconds.

The obtained percent of adipose tissue was calculated based on orientative standard values (below normal levels, normal values, excess of adipose tissue and obesity) considering the age and gender of the subjects (McCarthy et al. 2006). In order to estimate BMI the BMI reference chart was used in relation to the age and gender of the subjects (Barlow & Expert Committee, 2007).

In order to assess physical fitness 9 out of the 10 EUROFIT tests were used (the bicycle ergometer test was left out), measuring the flexibility of the lumbar region of the spinal column and of the back of the thigh (sit-and-reach), the general balance ability (Flamingo balance test), muscle power and endurance in the upper part of the body (bent arm hang), the explosive muscle power in the lower part of the body (standing broad jump), power and endurance of the abdominal muscles and of the hip flexor muscles (sit-ups), the power of the arms and forearms (handgrip test), the speed-coordination ability of the upper limbs (plate tapping), speed and coordination capabilities (10x5 m shuttle run) and cardiovascular endurance (endurance shuttle run).

The data of the individual measurements was statistically processed by the Statistical Package for Social Sciences software: version 20.0 SPSS Inc. (SPSS), performing the descriptive analysis and the comparing of the mean values. The independent sample t-test shows whether the mean values of the results obtained at the motor tests by the subjects with normal percent of adipose tissue is significantly different from the results obtained by the subjects with an excess of adipose tissue.

RESULTS

The gathered data show that the measurements were performed on 473 girls and 461 boys from the Bihor – Hajdú-Bihar Euroregion. In Bihor the average age was 12.55 years, and in Hajdú-Bihar it was 12.52 years. The mean values and the standard deviations of the anthropometric measurements and of the motor tests are presented in Table 1 and 2.

Table 1. Mean values and standard deviation of the anthropometric measurements

AM	Bihor			Hajdú-Bihar		
	G n=249 M (SD)	B n=225 M (SD)	Total n=474 M (SD)	G n=224 M (SD)	B n=236 M (SD)	Total n=460 M (SD)
H (cm)	154.42±7.37	157.25±10.19	155.77±8.93	158.36±8.51	159.48±11.46	158.93±10.14
W (kg)	48.58±12.01	51.43±13.42	49.93±12.77	52.55±13.04	52.20±14.06	52.37±13.56
BMI	20.26±4.02	20.59±4.19	20.42±4.10	20.79±4.18	20.30±4.14	20.54±4.16
% AT	24.19±8.06	19.65±8.30	22.03±8.48	23.59±8.53	17.62±8.60	20.52±9.06

Note: AM = anthropometric measurements H = height; W = weight, G = girls, B = boys

Table 2. Mean values and standard deviation of the motor tests

Motor test	Bihor			Hajdú-Bihar		
	G n=249 M (SD)	B n=225 M (SD)	Total n=474 M (SD)	G n=224 M (SD)	B n=236 M (SD)	Total n=460 M (SD)
FBT (no)	8.41±5.00	8.61±5.65	8.51±5.31	7.96±4.55	7.36±4.59	7.65±4.58
PT (sec)	12.52±1.77	12.56±2.53	12.54±2.17	12.28±1.61	12.30±1.89	12.29±1.76
SBJ (cm)	147.37±22.2	168.65±28.2	157.54±27.3	147.73±23.2	165.71±30.4	156.90±28.6
HT (kg)	22.90±5.09	27.13±7.96	24.92±6.94	25.84±6.53	30.10±9.98	28.00±8.72
SU (no)	21.37±3.95	24.89±4.55	23.05±4.59	19.47±4.78	23.10±6.50	21.32±6.00
BAH (sec)	5.30±6.07	11.45±11.27	8.24±9.44	6.83±7.30	13.21±12.15	10.08±10.55
SR (sec)	21.19±1.20	20.15±1.30	20.69±1.35	21.50±1.82	20.25±1.66	20.86±1.85
SAR (cm)	14.97±8.73	9.48±8.01	12.35±8.83	18.58±7.98	11.58±8.19	15.01±8.80
ESR:VO_2max	41.54±4.56	42.96±6.78	42.19±6.25	40.75±4.37	42.26±7.25	41.43±6.11
ESR:no.dist	29.87±10.62	41.33±19.78	35.32±16.66	26.43±12.37	34.50±17.28	30.58±15.61

Note: G = girls, B = boys, FBT = Flamingo Balance Test; PT = Plate tapping; SBJ= Standing Broad Jump; HT = Handgrip Test; SU = Sit-ups; BAH = Bent Arm Hang; SR = 10X5 m Shuttle Run; SAR = Sit-and-reach; ESR = Endurance Shuttle Run, VO_2max estimated after Léger (1988); no.dist = number of travelled distances;

According to Table 3, 21.5% of the total number of subjects had their percent of adipose tissue below normal values (8.8% BH; 12.7% HB); 49.9% had normal values (27.3% BH; 22.6% HB); 12.7% had an excess of adipose tissue (6.1% BH; 6.6% HB) and 15.9% were obese (8.6% BH; 7.3% HB). 28.6% of the total number of subjects had their percent of adipose tissue over normal values (n=117 for girls and n=150 for boys).

Table 3. Distribution of the percent of adipose tissue in the Euroregion

Orientative standard values	Bihor			Hajdú-Bihar		
	G n=249 n	B n=225 n	Total n=474 n	G n=224 n	B n=236 n	Total n=460 n
BNL	44 (17.7%)	38 (16.9%)	82 (17.3%)	49 (21.9%)	70 (29.7%)	119 (25.9%)
Normal val.	146 (58.6%)	109 (48.4%)	255 (53.8%)	117 (52.2%)	94 (39.8%)	211 (45.8%)
Excess AT	23 (9.2%)	34 (15.1%)	57 (12.0%)	27 (12.1%)	35 (14.8%)	62 (13.5%)
Obesity	36 (14.5%)	44 (19.6%)	80 (16.9%)	31 (13.8%)	37 (15.7%)	68 (14.8%)

Note: G = Girls; B = Boys, BNL = below normal values, Normal val. = Normal values,

The gathered data show that there is a significant relation between the BMI and the percent of adipose tissue ($r = 0.781$, $df = 932$ $p < 0.001$, CI = 95%) (Table 4). Most students who have a high level of BMI, also have a high percent of adipose tissue.

Table 4. The relation between BMI and the percent of adipose tissue

		BMI	Adipose tissue
BMI	Pearson Correlation	1	.781
	Sig. (2-tailed)		.000
	N	934	934

In tables 5 and 6 the mean values of the motor tests are presented for both genders, divided into two groups: the students with a normal percent of adipose tissue and the students with an excess of adipose tissue. The independent sample t-test shows whether the mean values of the results obtained at the motor tests by girls and boys with normal percent of adipose tissue is significantly different from the results obtained by the ones with an excess of adipose tissue.

Table 5. Distribution of the mean values of the motor tests in case of girls with a normal percent of adipose tissue and in case of girls with an excess of adipose tissue

Motor test	Bihor			Hajdú-Bihar		
	Normal AT n = 146	Excess AT n = 59	P	Normal AT n = 117	Excess AT n = 58	P
	M (SD)	M (SD)		M (SD)	M (SD)	
Sit-and-reach (cm)	14.56±8.22	14.71±9.19	0.912	19.30±9.63	18.98±7.97	0.827
Flamingo balance (no)	8.04±5.17	9.21±4.89	0.147	7.70±4.43	8.77±4.66	0.134
Sit-ups (n/30sec)	21.71±3.80	20.45±4.23	0.044	19.95±4.83	18.37±4.52	0.036
Handgrip (kg)	22.80±4.84	23.92±4.66	0.138	26.38±6.13	27.21±6.30	0.400
Bent arm hang (sec)	5.84±6.47	3.36±4.35	0.002	7.12±7.28	4.95±5.98	0.046
Standing broad jump (cm)	149.96±21.0	141.46±19.9	0.010	150.25±23.6	137.21±20.3	<0.001
Plate tapping (sec)	12.14±1.55	12.76±1.89	0.031	12.37±1.85	12.12±1.33	0.302
10x5 m shuttle run (sec)	21.05±1.14	21.24±1.27	0.315	21.46±2.20	21.66±1.34	0.449
Endurance shuttle run (no.dist.)	30.07±10.12	26.76±10.07	0.039	28.25±11.32	20.08±8.33	<0.001

Note: the value p calculated with the independent samples t-test; no.dist. = number of travelled distances

Table 6. Distribution of the mean values of the motor tests in case of boys with a normal percent of adipose tissue and in case of boys with an excess of adipose tissue

Motor test	Bihor			Hajdú-Bihar		
	Normal AT n = 109	Excess AT n = 78	P	Normal AT n = 94	Excess AT n = 72	P
	M (SD)	M (SD)		M (SD)	M (SD)	
Sit-and-reach (cm)	9.20±6.61	7.90±6.62	0.203	12.39±8.07	9.83±6.23	0.025
Flamingo balance test (no)	8.33±5.26	10.24±5.85	0.026	7.09±4.74	8.59±4.84	0.052
Sit-ups (n/30sec)	25.52±4.51	23.84±4.61	0.017	23.62±5.94	20.30±5.92	0.001

Handgrip test (kg)	27.00±7.41	27.04±8.08	0.975	30.09±8.84	30.67±12.42	0.741
Bent arm hang (sec)	12.83±11.19	6.68±8.73	<0.001	14.00±12.27	7.61±8.83	<0.001
Standing broad jump (cm)	170.76±26.9	157.80±25.9	0.002	171.10±27.6	141.81±23.0	<0.001
Plate tapping (sec)	12.47±2.09	12.52±1.94	0.856	12.18±1.92	12.93±1.94	0.018
10x5 m shuttle run (sec)	20.05±1.32	20.61±1.32	0.006	20.04±1.62	20.75±1.76	0.010
Endurance shuttle run (no.dist.)	42.88±21.08	34.94±17.33	0.009	39.66±17.44	23.32±12.52	<0.001

Note: the value p calculated with the independent samples t-test; no.dist. = number of travelled distances

Girls with a percent of adipose tissue within normal limits have obtained better results at 7 out of nine motor tests than those with an excess of adipose tissue: Flamingo balance test (BH: $p = 0.147$; HB: $p = 0.134$), sit-ups (BH: $p = 0.044$; HB: $p = 0.036$), bent arm hang (BH: $p = 0.002$; HB: $p = 0.046$), standing broad jump (BH: $p = 0.010$; HB: $p < 0.001$), 10x5 m shuttle run (BH: $p = 0.315$; HB: $p = 0.449$), endurance shuttle run (BH: $p = 0.039$; HB: $p < 0.001$), sit-and-reach (HU: $p = 0.827$), plate tapping (BH: $p = 0.031$). In both counties girls with an excess of adipose tissue had better results at the handgrip test (BH: $p = 0.138$, HB: $p = 0.400$).

Boys with a percent of adipose tissue within normal limits have obtained better results than those with an excess of adipose tissue at 8 out of nine motor tests: sit-and-reach (BH: $p = 0.203$; HB: $p = 0.025$), flamingo balance test (BH: $p = 0.026$; HB: $p = 0.052$), sit-ups (BH: $p = 0.017$; HB: $p = 0.001$), bent arm hang (BH: $p < 0.001$; HB: $p < 0.001$), standing broad jump (BH: $p = 0.002$; HB: $p < 0.001$), plate tapping (BH: $p = 0.856$; HB: $p = 0.018$), 10x5 m shuttle run (BH: $p = 0.006$; HB: $p = 0.010$) and endurance shuttle run (BH: $p = 0.009$; HB: $p < 0.001$). At the handgrip test boys with an excess of adipose tissue had better results in both counties (BH: $p = 0.975$; HB: $p = 0.741$).

DISCUSSIONS

The results of this study show that the mean values of the percent of adipose tissue for girls increases with age from 22.97% at age 11 to 26.92% at age 14. For boys this percent decreases from 20.93% at age 11 to 15.69% at age 14.

According to a study performed in Milan by Lovecchio et al. (2009), the mean value of the sit-and-reach test was 22.37±9.26 for girls (n=698) of age 11, compared to the results of girls from Bihor (n=64) who had 14.58±8.84 or 15.17±6.75 obtained by girls from Hajdú-Bihar (n=52). At the same test, boys (n=768) from Milan had better results 15.37±9.39 then those from Bihor (n=47) 10.53±6.84 and those from Hajdú-Bihar (n=50) 9.14±5.75. The mean values of the sit-ups test was 18.25±5.0 for girls from Milan which are lower compared to the results of girls from Bihor who had 20.91±3.37 but higher then the results of girls from Hajdú-Bihar who had 17.38±4.46.

Comparing the results of the Eurofit tests performed by Şerbescu, (2008) among boys (n=89) of age 10 from Oradea (in the year 2004) and the results of this study for boys (n=47) of age 11, we find out that except the sit-and-reach test, at seven motor tests (Flamingo balance test < 5.04 (n), plate tapping < 0.95 (sec), standing broad jump > 37.91 (cm), sit-ups >7.88 (n), bent arm hang > 6.43 (sec), 10x5 m shuttle run < 2.51 (sec) and endurance shuttle run > 0.45 kmh^{-1}), we see that the more recently tested students had better results. Comparing the results of girls of age 10 (n=109) from 2004 and of girls of age 11 (n=64) from 2014, we see that at the Flamingo balance test < 4.65 (n), plate tapping < 0.33 (sec), standing broad jump > 35.48 (cm), sit-ups

> 5.01 (n), bent arm hang < 0.66 (sec) and 10x5 m shuttle run < 2.49 (sec), the students of this study had better results.

CONCLUSIONS

The performed study allowed us to establish the followings:

- the prevalence of the excess of adipose tissue was 28.6%
- girls with a normal percent of adipose tissue obtained better results than those with an excess of adipose tissue at 7 motor tests: Flamingo balance test, plate tapping (partially), standing broad jump, sit-ups, bent arm hang, 10x5 m shuttle run, endurance shuttle run and sit-and-reach test (partially)
- boys with normal percent of adipose tissue had better results than those with an excess of adipose tissue at 8 out of 9 motor test.
- in both counties girls as well as boys with an excess of adipose tissue had better results at the handgrip test.

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ASPECTS RELATED TO THE CONDUCT OF THE PHYSICAL EDUCATION CLASS IN PRIMARY SCHOOL

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Abstract: Physical education, a subject included in the core curriculum in all educational cycles, with different number of hours, aims at training students attitudes and habits, specific to its field, also targeting other areas of education. The current pre-university education in Romania, including the physical education classes, joined the European standards of education. These require further reforms in both the organizational documents and the deployment methodology in the educational process in all university institutions. It is known that physical education lessons are conducted in dedicated facilities (sports court, gyms) but what solution is there when we do not have these spaces? The classroom remains a loophole rescue, a space to be exploited with more creativity and motivation. This paper proposes a series of teaching strategies to achieve the objectives of physical education in primary school.
Key words: physical education, primary school, classroom, teaching strategies

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INTRODUCTION

Physical education, a subject included in the core curriculum in all educational cycles, with different number of hours, aims at training students attitudes and habits, specific to its field, also targeting other areas of education (Stănescu, et. al. 2009). It is the first kind of education that exerts its influence on the body. Physical education targets the human biological side (Cucoş, 1998). Raţă, 2008 states that physical education is "a component of general education that through exercise, conducted voluntarily, in an organized manner or independently, can produce the change of human behavior in a motor, cognitive, social, moral, emotional and aesthetic way". Also, practicing physical exercises will contribute to motivation and interest for the movement, leading ultimately to the enrichment of social existence and control of individual life (Raţă, 2008). Society is changing and with it the education systems. This explains the fact that almost all the countries have held educational reforms. In Romania, the reform has proposed a more efficient education, more pragmatic to meet the contemporary requirements (Cristea, 2015).

SCOPE

The explosive development of technology in recent years has produced, in the society, a diminishing share of exercise in the daily programme of the individual, generating trends of

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overeating, sedentary and an increasing number of cases of children with heart disease and obesity (Pop, Stef, Lucşan, 2012). The same authors show that 45% of 3rd grade students in the study are of normal weight, 21% are overweight, 27% are obese and 7% are underweight and among the 4th grade students, 35% were normal weight, 38% are overweight and 27% are obese. This aspect, not at all gratifying, can be put on the lack of adequate materials, which ensure optimum working conditions (Cristea, D., Cristea, A., 2015).

The current pre-university education in Romania, including physical education, joined the European standards of education. It requires new reforms, both in organizational documents and the deployment methodology in the educational process in all university institutions (Dragomir, Scarlat, 2004). Paradoxically, there is always a discussion about change, modernization, high standards, but what happens if we do not have optimal working conditions, adequate spaces for conducting physical education lesson? All these goals will remain utopia. There would be a key concept of the contemporary world, namely flexibility, which means adapting to change (Hava, 2015).

By analyzing the basic documents (curriculum, syllabus, etc.) that ensure the organization and conduct of physical education, the fact that the core focus is on increasing the normal and harmonious development of body, motor skills development and training students motion skills is highlighted (Scarlat E., Scarlat M., B., 2002**)**.

No mather of the place where the physical education lesson is unfolding, the organisation of the learning environment is an important aspect of the planning and delivery of teaching. Organisation should focus on students, and on the teacher himself/herself, the space, the equipment and the best use of time. We can identify three key organisational points: before the lesson starts, during the lesson and once the lesson has finished (Lawrence, Whitehead, 2010).

Another aspect, not without importance, is the safety and protection of students during the physical education classes. The role of PE teacher is to ensure development of a culture of teaching safely, creating and managing a safe learning enironment (Chappell, Katene, 2010). This must be managed carefully and responsibly, especially since the physical education class is conducted in poor working conditions, in this case, in the classroom.

Ways of conducting physical education lessons in school education

Lessons conducted in optimal conditions, with the following characteristics (Dragnea, et.al. 2006):

Links to "Prepare the body for effort" and "Selectively influencing musculoskeletal apparatus" can unite their content;

Sometimes the third link can be waived, but the objectives will be achieved through age appropriate means, the level of training of the staff and the typology of the lesson.

The harmoniously developing physical exercises (DFA) made of sturdy gym in major positions and derivatives of the body can be replaced with moving exercises (variants of walking, running) specific to train the body for the effort to engage all body segments in complex movements.

There are alternative means of going through these two links by using background music, of the aerobic type.

In primary and secondary education, the presence of rigorous working groups, allowing the possibility of observing the discipline / correction executions is recommended.

Also, in this type of deployment, the third link in the lineup can be done freely, without the counting of the teacher, in their own rhythm, but with a dosage required by the leader. To contribute to self-organization and self-management skills training, the best solution is for a student to lead some sequences of lessons under the guidance of the teacher.

Motor skills can be educated through specific athletics, gymnastics, sports games, dance and other disciplines in the curriculum. The presence of objects in sports games gives the

opportunity and means of increasing the number of variants used, on the one hand and ensuring the lesson, on the other hand. The optional type lessons may include integrated approach to other disciplines such as eurythmy, classic or modern dancing, , ballet, pantomime, dance theme, the art of acting.

Physical education lessons conducted in"special" conditions:

Physical education lessons held outdoors in the "cold"season:

They ensure the quenching of the body; the temperature is not less than 10 degrees.

Methodological requirements: Work must be dynamic; lesson density will be obtained through the front exercises in groups or homogeneous groups; major breaks will be avoided, the tendency is for a continuous activity; no new skills will be learnt; skills / motric activities will be addressed during consolidation or improvement, without interruption for explanations or demonstrations; it is indicated that the topics should be in the moving qualities such as speed or endurance involving almost continuous movement and an increased tempo; exercises that can cause accidents will be avoided.

Lessons held indoors in improvised spaces (classrooms, corridors, etc.) include: arranging the workspace; selection of means, adequate working forms, methodical practice-front groups, in pairs, individually; the venue should be downstairs not to disturb other activities; hygiene measures are required (ventilation, dusting ...); activities are aimed at developing forms of speed, the capacity to coordinate elements of acrobatic gymnastics (static elements) and jumping with support devices (if they exist).

OBJECTIVE

This paper proposes a series of teaching strategies to achieve the objectives of physical education in primary school.

MATERIALS AND METHODS

Bibliography study method that was developed theoretical foundations of this work. Also studied materials helped us to formulate ideas and reflections with which we have clarified the issues and uncertainties arising during the work.

Observation method was performed throughout the research observations so spontaneous and intentional.

Exercises and indicated games: to increase the attractiveness and efficiency of the physical education class indoors (classroom), we propose some exercises and games such as:

Figure 1. Used materials
(Source: personal archive)

Exercises to captivate attention, exercises to develop rhythm: clapping on the bench, thighs, feet, on the ground, carried out individually or in pairs with the fellow student (e.g. 2 clapping of hands, two beatings on the bench, two beatings with the hands on the thighs, 2 stamping of the feet); pactising fast: hands on his head, hands over the eyes, hands on his

forehead, hands on ears, hands on hip and other parts of the body, etc; reverse order in which the student executes what is said, not what is shown (e.g. the command of the teacher: hands on his head (the teacher will put hands on shoulders confussing the students)); carrying out the previously mentioned exercises by the teacher at a number of beats of hands accomplished by the teacher (e.g. individual clapping in 4-stroke 8 times; at 2 clapping of hands, two claps in pairs, face to face; at 3 clapping of hands, 3 beating on the bench)

Exercises for harmonious physical development: free exercises; napkin exercises; balloon exercises; tennis balls exercises; large plastic 18-20 cm balls exercises.

The exercises can be made in the standing position beside the bench or the sitting position in the bench, with or without arching, such as:

Standing beside the bench: lifting of arms in front; bending and simultaneous and alternative stretchings of the arms in front and upwards; individual twisting of the trunk or interacting with the pair pupil (fig.2); bending of the trunk by supporting the hands on the bench; lifting up and sitting down of a bent leg on the chair.

Figure 2. Exercises in the sitting position with the interaction of the pair pupil
(Source: personal archive)

Sitting on the bench: lifting of arms; bending and simultaneous and alternative stretchings of arms in fornt and upwards; individual twisting of the trunk or interacting with the pair pupil; bending of the trunk; alternative lifting of the legs by clapping the hands under the knees (fig.3);

Figure 3. Exercises of back to back sitting
(Source: personal archive)

Games: with ball; shares in front of the length of the bank from sitting in the bank: running the ball on the bench to the desk mate and vice versa; running the ball high off the bench to the desk mate, collecting the ball and handing the ball with both hands to the mate (fig.5); running the tennis balls simultaneously on the bench;

Figure 4. Pair exercises with the big ball
(Source: personal archive)

Shares from the backbone: Sending the ball over the head with different variants of return

With the balloon: keeping the balloon in the air as much time using hands, fists, elbows, head or combined; keeping the balloon in the air as long as possible by blowing in it; chase with the balloon by standing face to face, freely and in the form of competition; demolition of the glasses by using air balloons inflated in advance as a competition;

Throwing on target: in sustained circles; to the paper stick on the wall; throwing of the sacks on a free plain or marked surface; hitting the balls, these being the targets, with other balls.

Relays: running and drawing on the board of different objects (a house, a ship, words if the children know how to write, geometrical shapes); running and doing a puzzle; exercises to develop coordinate abilities – *relays with glasses* e.g.; running with 6 plastic glasses, one in the other ones in one hand and their placing on the table in a pyramid construction (fig.5);

Figure 5. Glass constructions as a competition
(Source: personal archive)

Running with 2 plastic glasses, each glass in one hand and a tennis ball in it; running with 2 glasses in one hand, one kept in the hand, the other one turned over the one in the hand, by keeping them both in balance (fig.6); running with the ball sustained by 2 plastic glasses on their lateral sides (fig.6);

Figure 6. Relays by manipulating glasses
(Source: personal archive)

Exercises to develop different muscular groups in different positions, free or with different objects depending on the age and level of training: sitting down; sitting on a chair or the bench; high supporting while lying.

Figure 7. Exercices for strength training
(Source: personal archive)

CONCLUSIONS

To organize and conduct a physical education lesson in the classroom is a challenge for the physical education teacher who is forced to adapt teaching content to unsuitable conditions.

Imagination, divergent thinking, permanent concern can be an asset of the physical education teacher, who has to find relevant solutions adapted to those conditions.

The classroom should not constitute a barrier to the physical education class at primary school, on the contrary it can be a successful option for the practicing beginners students who must get used to master large collective of students (25-33 students). The workplace enables them to monitor the team.

Even if space is not very generous, students remain hopeful during the physical education class as long as the proposed activities are attractive and pleasant.

The spirit of emulation is present in all the activities proposed and the attention should be directed toward those students with lower motor potential that can be highlighted here.

Lessons conducted in the classroom require more elaborate preparation of the teacher's side to find suitable material resources.

Even if at first glance physical education would seem impossible to achieve in the classroom, this study demonstrates the opposite and moreover offers a generous range of activities made possible.

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EFFECTS OF PHYSICAL ACTIVITY ON BODY COMPOSITION IN ADULT WOMEN

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Abstract: Data published by the World Health Organization (WHO) and the International Association for the Study of Obesity (IASO) suggests that the number of obese people in Europe has tripled in the last 20 years and resulted in a prevalence of 130 million obese and 400 million people overweight (Sassi et al., 2009). Body composition is the relative percentage of fat and fat-free mass (bones, muscles, organs, water, blood) of total body weight. After Wilmore, Buskirk, DiGirolamo and Lohman (1986) the optimal level for health of body fat is 16-25% (18-30%) for women. The objective of our study was to assess body composition of adult women, identifying the effect of intervention program on body fat and lean mass, and uncover cases of obesity and overweight. The study involved 95 adult women from Fit4U Fitness Center in Oradea. Period of the study: February 2015 - June 2016. Anthropometric measurements were made: height, weight, circumference, subcutaneous folds. It was calculated the body mass index (BMI), body composition and optimal body weight (estimation based on the five skinfolds measures). The physical activity program consisted of Step - aerobics, Pilates and strength training in the gym, 3 times a week for 60-90 minutes, for 12 months. Results: mean body mass, BMI, BF%, real BF decreased significantly. Mean body fat percentage from 25,63% (± 6,53) decreased to 22,95% (± 5,56). In the studied group overweight and obesity is more frequent in the age group between 35-44 years, but it can be seen the prevalence in all age groups. Conclusions: the physical activity program had a beneficial effect on body composition - by reducing body fat.We found cases of overweight and obesity (21% of the study group).

Keywords: body composition, obesity, adult women, physical activity.

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INTRODUCTION

Exercise, recreation, movement in an"accelerated" world, when women are directed towards career too, are absolutely necessary, studies showing high levels of physical inactivity since childhood (Atkin, 2013; Blair, 2009; Ruiz et al. , 2011).

For health maintanance it should be understood and applied a healthy lifestyle. Many women "who think they are healthy" are fighting with overweight or inadequate body

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composition. Promoting a healthy lifestyle is the most effective way of preventing illness and maintaining health (Woolf et. A., 1996 cited. Courtenay, 2000).

Body weight depends on many factors, the most significant being those related to individual attributes such as: height, age, sex, body constitution, body composition. It also depends on hereditary, environmental, economic, geographic factors. Recommended optimal body weight is the weight at which a person feels good, is healthy and is satisfied with his physical appearance (Şerbescu, 2007).

Body composition is the relative percentage of fat and fat-free mass (bones, muscles, organs, water, blood) of total body weight. Adipose tissue is made up of essential body fat (is present in the nervous tissue, bone marrow and organs) and non-essential or storage fat (represented by subcutaneous adipose tissue, over the muscle fascia, around the kidneys, liver and heart). Essential body fat is approximately 3% of body mass for men and 12% of body mass for women. In general, the total body fat percentage (essential plus storage fat) is between 12% and 15% for young men and between 25% and 28% for young women. Fat percentage varies according to age: in women up to 30 years in the range of 14-21%, between 30-50 years is 15-23%, respectively 16-25% over 50 years (Jeukendrup & Gleeson, 2010). After Wilmore, Buskirk, DiGirolamo and Lohman (1986) the optimal level for health of body fat is 12-18% (10-25%) for men and 16-25% (18-30%) for women.

People are considered obese when the body mass index (BMI) exceeds 30 kg/m2 (WHO, 2000). Data published by the World Health Organization (WHO) and the International Association for the Study of Obesity (IASO) suggests that the number of obese people in Europe has tripled in the last 20 years and resulted in a prevalence of 130 million obese and 400 million people overweight (Sassi et al., 2009).

The lifespan of an obese person with a BMI between 30 and 35 is two to four years shorter than that of a person of normal weight. The gap increases to eight to ten years for those who are severely obese (BMI of 40-45), mirroring the loss of life expectancy suffered by smokers. An overweight person of average height will increase their risk of death by approximately 30% for every 15 additional kilograms of weight (Sassi, 2010). However, a growing body of research shows that the impact of obesity on disability is far larger than its impact on mortality (Gregg and Guralnik, 2007).

According to WHO (2009), 6% of deaths worldwide are caused by physical inactivity, being considered as an important risk factor. Overweight and obesity are responsible for 5% of global mortality (WHO, 2009).

It has been shown that participation in regular physical activity reduces the risk of coronary heart disease and stroke, diabetes, hypertension, colon cancer, breast cancer and depression. Additionally, physical activity is a key determinant of energy expenditure, and thus is fundamental to energy balance and weight control (WHO, 2002-2009).

Physically active adults are likely to have less risk of a hip or vertebral fracture. Increases in exercise training can minimize the decrease in spine and hip bone mineral density. Increases in exercise training enhance skeletal muscle mass, strength, power, and intrinsic neuromuscular activation (Bauman, A. et al., 2005; Warburton, D. et al., 2006).

Levels of physical activity tend to decrease with increasing age (Hawkins et al., 2009; Jones, Ainsworth, Croft, Macera, Lloyd, & Yusuf, 1998) and women tend to be less active than men (Jones et al.; Marshall, Jones, Ainsworth, Reis, Levy, & Macera, 2007).

The prevalence of obesity in adults is relatively low in Romania (~8%) is now the lowest in the EU27, more than 2 times below European highs (over 18% in Hungary and the UK). Instead, prevalence of overweight in Romania (35.9%) is the highest in the EU27 and the general trend is one of a worsening situation (Eurostat, 2011).

The Non-communicable Diseases Risk Factor Collaboration in their pooled analysis of 1698 population-based studies, with more than 19 million participants representing most countries found that between 1975 and 2014 the mean age-corrected BMI increased from 21,7 kg/m^2 to 24,2 kg/m^2 in men and from 22,1 kg/m^2 to 24,4 kg/m^2 in women. The prevalence of obesity also increased from 3,2%, in 1975 to 10,8% in 2014 in men and from 6,4% to 14,9% in women (NCD Risk Factor Collaboration, 2016).

OBJECTIV OF THE STUDY

The objective of our study was to assess body composition of adult women, identifying the effect of intervention program on body fat and lean mass, and uncover cases of obesity and overweight.

MATERIALS AND METHODS

Subjects

This study involved 95 adult women (originally 119) who attended two gyms of Fit4U Fitness Center in Oradea.

Period of the study: February 2015 - June 2016. Baseline assessment were conducted in February-March 2015. The subjects attended the gym for 12 months, and during May-June 2016 were carried out the follow-up evaluations. At the follow-up evaluation participated 95 women of 119, others abandoned/quitted along the way (for various reasons: maternity leave, over 2 weeks of physical inactivity).

The research included only those women who showed interest, accepted the measurements and gave permission that their data to be used in research. So it was non-random sampling, from non probabilistic sample category we used the convenience (Sandor, 2013).

Methods

Anthropometric measurements were performed after the standards described by ISAK - International Society for the Advancement of Kinanthropometry:

- stature (in centimeters, with stadiometer);
- body mass/weight (in kg using a calibrated wheighing scale);
- ghirts (in cm, antrophometry tape) in the following areas: neck, chest, arm relaxed, waist, hips, thigh, calf;
- skinfolds (in mm, with Slim Guide caliper): only at the right side of the body, 3 times each region and using the average value in the following 5 regions: biceps, subscapular, abdominal, supraspinal (or wing), thigh .

Calculation of body composition and optimal body weight was made after formulas by the National Center for Sports Medicine from Romania (Dragan, I. 2002. Iliescu, A. 2013; Şerbescu, C. 2007) based on the measurement of five skinfolds: biceps, subscapular, abdominal, supraspinal and thigh in mm.

Then, after assessing body fat percentage (BF%), actual body mass (BM kg), actual fat-free mass (FFM kg), was calculated the optimal body fat in kilograms (BF kg), optimal fat-free mass, and the optimal body mass/weight:

Body fat percentage (BF%) = (5 skinfolds sum(mm) x 0.15) + 5.8 + (BSA)m^2

BSA = Body Surface Area, was estimated using Du Bois formula (Du Bois, 1916)

Actual BF (kg) = Actual body mass(kg) x BF%

Actual FFM (kg) = Actual BM (kg) – BF(kg)

Optimum FFM (kg) = Actual BM(kg) x 75%

Optimum BF = Optimum FFM x 25%

Optimal Body mass (kg) = Optimum FFM (kg) + Optimum BF

Data were statistically analyzed with SPSS, version 15.0 (descriptive analysis and comparison of means).

Physical activity program

The physical activity program consisted in combined training of Step - aerobics, Pilates and strength training in the gym, 3 times a week for 60-90 minutes, for 12 months.

Depending on individual objectives (weight loss, decrease body fat - at overweight and obese subjects/weight gain - at underweight subjects) was different the number of repetitions, different load and intensity of training used.

There where used: dynamic, repetitive exercises, with large muscles groups; hard resistive exercises; functional exercises; high intensity interval training; balance exercises (Pilates); circuit training; stretching exercises.

Muscle strenghtening was conducted mainly in the following muscle groups: upper limb muscles, back muscles, abdominal muscles, lower limb muscles.

RESULTS

They were assessed 95 adult women, aged between 18 and 52 years. For objective analysis of the measurements, subjects were distributed on age categories shown in Table 1.

Tabel 1. Subject distribution by age categories

	18 – 24 years	25 – 34 years	35 – 44 years	45 – 52 years
Nr. of subjects	41	31	14	9
Percentage	43,2%	32,6%	14,7%	9,5%

Baseline and follow-up means of evaluated somatic parameters for the whole group are presented in Table 2.

Tabel 2. Descriptive analysis of anthropometric measurements

Anthropometric characteristics					
		Mean (±SD)	**Min**	**Max**	**p≤0,05**
Age (years)		28,45 (±8,74)	18	52	
Weight (kg)	Baseline	63,67 (±11,69)	43	103	0,000
	Follow-up	62,39 (±10,63)	43	98	
	Optimal	59,69 (±10,96)	40,31	96,56	
Height (cm)		166,88 (±6,36)	150	190	
BMI (kg/m²) Baseline		22,86 (±3,76)	16,61	36,49	0,000
BMI (kg/m²) Follow-up		22,40 (±3,60)	16,96	34,72	
Sum of 5 skinfolds (biceps, subscapular, abdominal, supraspinal, thigh) mm Baseline		120,83 (±42,90)	58	247	0,000
Sum of 5 skinfolds (biceps, subscapular, abdominal, supraspinal, thigh) mm Follow-up		103,04 (±36,48)	40	208	
BF % Baseline		25,63 (±6,53)	16,22	45	0,000
BF % Follow-up		22,95 (±5,56)	13,37	39,11	
BF (kg)	Baseline	16,95 (±7,61)	8,33	45,90	0,000
	Follow-up	14,79 (±6,26)	7,09	38,33	
	Optimal	11,94 (±2,19)	8,06	19,31	
Fat-free mass (kg)	Baseline	46,71 (±5,20)	34,58	64,57	0,850
	Follow-up	47,66 (±5,51)	34,58	64,57	
	Optimal	47,75 (±8,77)	32,25	77,25	
	Neck Baseline	31,89 (±2,13)	28	41	0,000
	Neck Follow-up	31,27 (±1,92)	28	40	
	Arm (right) Baseline	28,41 (±3,81)	22,5	43	0,000

Girth (cm)	Arm (right) Follow-up	27,66 (±3,65)	23	41	
	Arm (left) Baseline	28,32 (±3,68)	23	42	0,000
	Arm (left) Follow-up	27,57 (±3,57)	23	41	
	Chest Baseline	76,71 (±8,17)	60	101	0,000
	Chest Follow-up	76,03 (±7,86)	60	98	
	Waist Baseline	73,15 (±9,62)	58,5	103,5	0,000
	Waist Follow-up	72,15 (±8,94)	59	99	
	Hip Baseline	98,97 (±8,68)	85	130	0,000
	Hip Follow-up	97,36 (±7,21)	84	120	
	Thigh (right) Baseline	56,42 (±5,95)	31,5	75	0,000
	Thigh (right) Follow-up	55,73 (±5,58)	31	72	
	Thigh (left) Baseline	56,13 (±5,86)	31	72	0,000
	Thigh (left) Follow-up	55,57 (±5,54)	31	71	
	Calf (right) Baseline	36,80 (±3,96)	31	59	0,000
	Calf (right) Follow-up	36,47 (±3,83)	31	58	
	Calf (left) Baseline	36,83 (±3,97)	31	59	0,000
	Calf (left) Follow-up	36,47 (±3,76)	31	58	

The results of the baseline and follow-up means of evaluated somatic parameters on age groups can follow in Table 3.

Tabel 3. Baseline and follow-up means of evaluated parameters on age categories

Age category	**Nr. of subjects**	**Evaluated parameters**	**Mean (±SD)**		**P - value (p≤0,05)**
			Baseline	**Follow-up**	
18 – 24 years	41	Weight (kg)	59,05 (±8,57)	58,44 (±7,89)	0,003
		BMI	20,90 (±2,71)	20,68 (±2,46)	0,002
		Sum of skinfolds (mm)	103,51 (±33,58)	91,22 (±27,27)	0,000
		BF %	22,99 (±5,11)	21,14 (±4,16)	0,000
		Real BF (kg)	13,92 (±5,27)	12,62 (±4,30)	0,000
		FFM (kg)	45,12 (±4,12)	45,91 (±4,38)	0,000
25 – 34 years	31	Weight (kg)	66,35 (±13,47)	64,42 (±12,07)	0,002
		BMI	24,13 (±4,51)	23,45 (±4,14)	0,001
		Sum of skinfolds	130,26 (±45,75)	108,16 (±41,20)	0,000
		BF %	27,06 (±6,99)	23,73 (±6,27)	0,000
		Real BF (kg)	18,75 (±8,95)	15,86 (±7,43)	0,000
		FFM (kg)	47,59 (±5,48)	48,55 (±5,88)	0,000
35 – 44 years	14	Weight (kg)	68,36 (±12,95)	66,93 (±12,01)	0,045
		BMI	24,68 (±3,87)	24,11 (±3,54)	0,023
		Sum of skinfolds	140,29 (±43,57)	118,43 (±36,85)	0,000
		BF %	28,60 (±6,65)	25,31 (±5,64)	0,000
		Real BF (kg)	20,19 (±8,24)	17,51 (±6,94)	0,002
		FFM (kg)	48,16 (±6,24)	49,62 (±6,41)	0,011
45 – 52 years	9	Weight (kg)	68,22 (±9,35)	66,33 (±9,34)	0,005
		BMI	24,64 (±3,26)	23,96 (±3,26)	0,005
		Sum of skinfolds	137,00 (±47,05)	115,33 (±44,06)	0,000
		BF %	28,11 (±7,09)	24,84 (±6,64)	0,000
		Real BF (kg)	19,52 (±6,74)	16,79 (±6,11)	0,001
		FFM (kg)	48,69 (±5,72)	49,54 (±5,90)	0,125

Calculating BMI of the subjects included in the study shows that 71% had normal weight, 16% were overweight, 8% underweight and 4% had obesity class I, 1% class II obesity. At the

final assessment 74% were normal weight, 13% were overweight, 9% underweight, 4% obese class I and no one had class II obesity (figure 1).

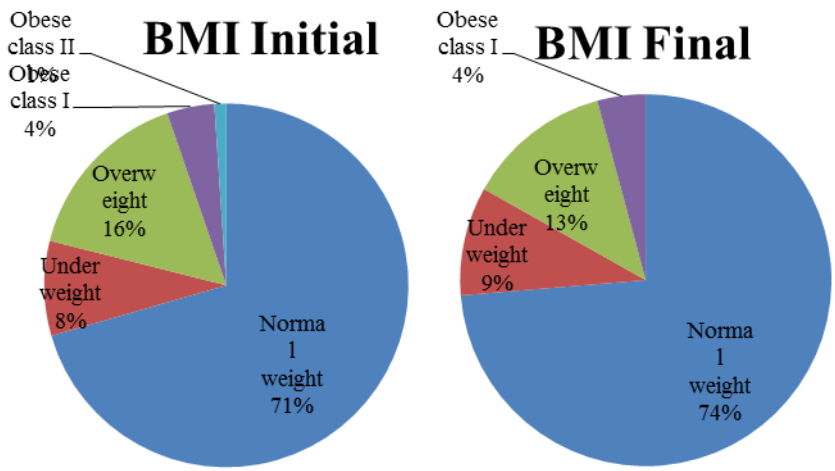

Figure 1: Percentage of body weight based on BMI

In Table. 4. you can follow the numerical and percentage prevalence of overweight and obesity subjects, by age groups, at the baseline and follow-up evaluation.

Table 4. The prevalence of overweight and obesity on age categories

	18 – 24 years (41 subjects)		**25 – 34 years** (31 subjects)		**35 – 44 years** (14 subiecți)		**45 – 52 years** (9 subjects)		**Total 18 – 52 years** (95 subjects)	
Nr. of overweight and obese subjects	**B***	**F****	**B**	**F**	**B**	**F**	**B**	**F**	**B**	**F**
	5	3	8	7	5	4	2	2	20	16
Percentage	12,2%	7,3%	25,8%	22,6%	35,7%	28,6%	22,2%	22,2%	21,1%	16,8%

*B=Baseline; **F=Follow-up

DISCUSSIONS

The mean weight of the group at baseline was 63.67 (± 11.69) kg and at follow-up was 62.46 (± 10.71) kg, 1,21 kg less than the baseline mean. Although, according to statistical analysis the loss is significant (p = 0.000), we consider this weight loss after 12 months training program is low. But we have to take into account that 8% of subjects were underweight, they wanted to gain weight, and 16% of overweight subject lost on average 2,73 kg, respectively 4% obese lost 3,25 kg.

Baseline mean of body fat percentage (BF%) was 25,63% (± 6,53), which is at normal range, but 26 women had BF% higher than the threshold, above 28%. Above this threshold are considered a risk for health (Jeukendrup & Gleeson, 2010). Follow-up mean of BF% was 22,95% (± 5,56) and exceed the threshold of 28% only 18 subjects.

Baseline mean of real body fat (BF kg) decreased with 2,16 kg from 16,95 (±7,61) kg to 14,79 (±6,26) kg. Paired sample T test shows that the loss is significant (p = 0.000), and the age category at which the loss is the highest is 25-34 years: 2,89 kg (Table 3.).

There are studies indicating the same tendencies in weight loss, BF%, real BF loss, like in our study, after a similar physical activity training programme (Skrypnik et. al, 2015; Willis et. al, 2012).

The mean of fat-free mass increased from 46,71 (± 5,20) to 47,66 kg (± 5,51) kg.

Baseline mean of the sum of 5 skinfolds (biceps, subscapular, abdominal, supraspinal, thigh) was 120,83 mm, which is above the general average, normally the sum of these skinfolds is between 80-100 mm (Ionescu & Gurău, 2006; Șerbescu, 2007). At the follow-up the sum of 5 skinfolds approached this threshold: 103,04 mm.

Baseline mean of waist girth was 73,15 (± 9,62) cm, which is considered normal, but we must mark that 20 of the 95 subjects were over 80 cm, which is the maximum recommended by the World Health Organization. Above this threshold there is an increased risk of developing heart disease, diabetes etc. (WHO, 2008). Follow-up mean of waist girth was 72,15 (± 8.94) cm and 18 subjects were over 80 cm.

The prevalence of obesity in adults is relatively low in Romania (~8%), whereas the prevalence of overweight is the highest in the EU27: 35,9% (Eurostat, 2011).

At the group studied by us the trend is the same: 5% are obese and 16% are overweight.

According to the study of Prospective Studies Collaboration from 2009, unhealthy diets, sedentary lifestyles and obesity are responsible for a considerable proportion of the burden of ill health and mortality. The largest existing study of the link between obesity and mortality, covering close to one million adults in Europe and North America, came to the conclusion that mortality increases steeply with BMI once individuals cross the 25 kg/m2 threshold (the lower limit of the overweight category) (Prospective Studies Collaboration, 2009). **At the group studied by us 21% cross this threshold.**

In our study can be seen overweight and obesity in all age groups and highest percentage can be observed in the age group between 35-44 years (Table 4.).

CONCLUSIONS

Implementation of the physical activity program for 12 months showed significant changes in body composition. It should be noted that subject's diet and nutrition has not changed. The intervention program on body composition had a beneficial effect – by reducing body fat percentage with 2,68% and actual BF with 2,16 kg, increased of fat-free mass (FFM) with 0.95 kg. We probably had a greater impact on body composition with daily frequency of training program and if we could monitor and influence nutrition. Also at the training programme we haven't the possibility to differentiate the subjects by age group or by level of physical condition.

We found cases of overweight and obesity: 21% of the study group.

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

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

Key words: anthropometric development, dynamic games, volleyball.

* * * * * *

INTRODUCTION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SCOPE

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

OBJECTIVES

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

HYPOTHESIS

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

MATERIALS AND METHODS

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

SAMPLE OF RESEARCH

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

Table 1. Distribution of student samples of the research

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

RESULTS

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

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

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

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

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

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

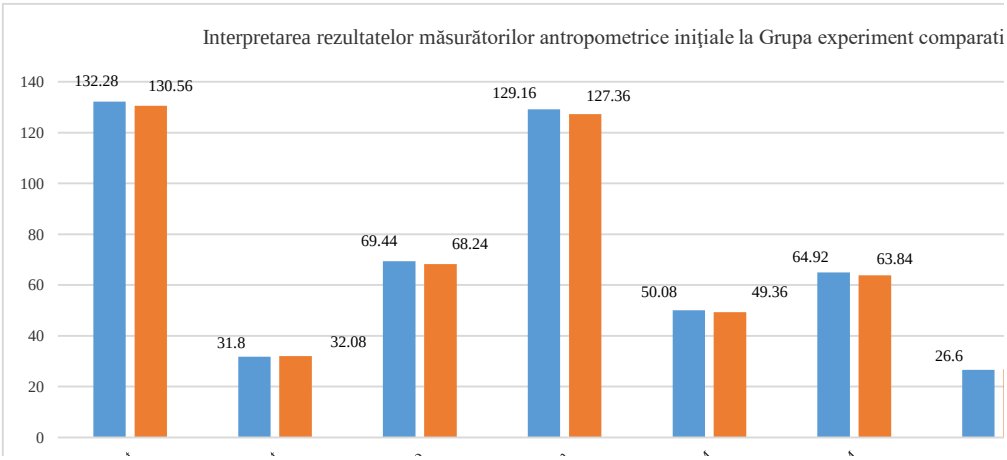

Figure 1 – The interpretation of the anthropometric measurements at the Experiment group compared with the Control group – Initial test

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

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

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

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

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

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

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

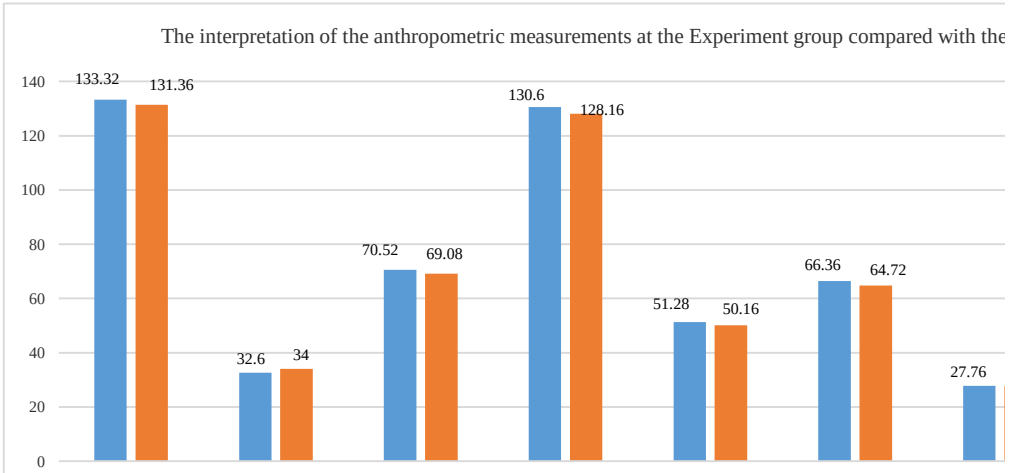

Figure 2. – The interpretation of the anthropometric measurements at the Experiment group compared with the Control group – Final test

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

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

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

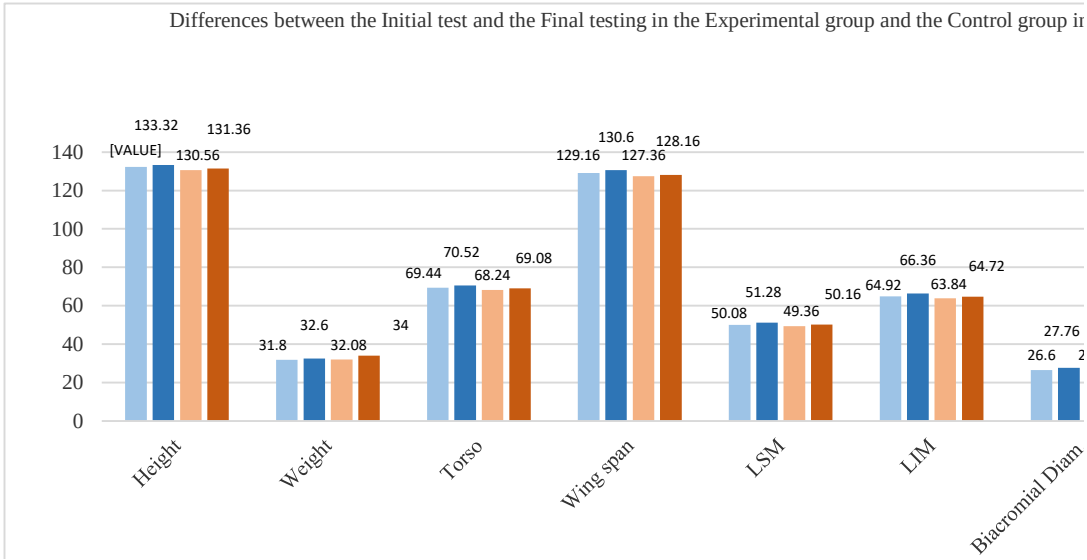

Figure 3. – Differences between the Initial test and the Final testing in the Experimental group and the Control group in anthropometric examination

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

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

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

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

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

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

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

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

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

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

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

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

Description of technical tests:

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

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

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

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

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

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

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

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

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

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

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

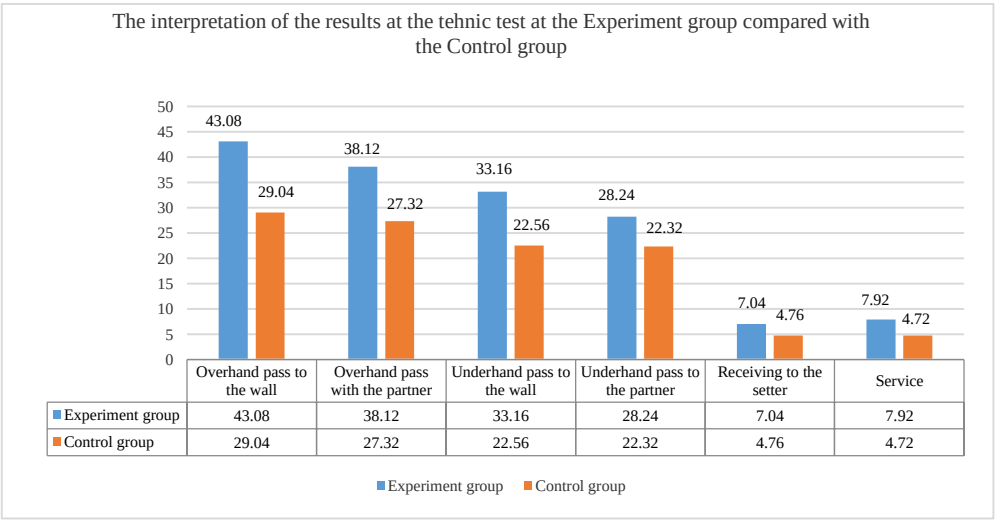

Figure 4. – The interpretation of the results at the tehnic test at the Experiment group compared with the Control group

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

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

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

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

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

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

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

CONCLUSIONS

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

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

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

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

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ASPECTS REGARDING THE ORGANIZATIONAL STRUCTURE, QUALITY AND PERFORMANCE OF SPORT IN HIGHER EDUCATION IN ROMANIA

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Abstract: This study addresses sport in higher education in relation to its organization structure, quality and sports performance. We have studied documents, normative acts and the way in which certain decisional factors involved in higher education sports activities are organized. The lack of a concrete strategy in this respect, renders the information sources to be relatively limited. Particularly, our research was based on scientific documentation, historical method and document analysis. There is a small number of legitimated athletes related to the number of higher education students. Higher education sport is a non-functional system, it cannot generate a representative number of participants in the National University Championships, and the international representation is not a natural consequence of the internal competition. Therefore, it is imperative for higher education sports to be the foundation of performance sports. This involves changing both the approach to this phenomenon and its organizational structure. Also, the development of human resources and sports infrastructure are essential conditions for the development of sports activity.

Key words: team sport, higher education, athletic coach, sports activity, organizational structure, performance in sports

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INTRODUCTION

Sport includes a diversity of physical activities that, unconditioned by the form of organization, aim mainly to improve the physical and mental condition of those who practice them, to initiate and develop social relationships or to achieve performances in competitions at all levels (Gonçalves, Figueiredo, Rama, & Carvalho, 2013). As part of this approach, in the E.U., sport is viewed as a major component of the educational approach at all levels, including within higher education.

More and more, sport represents a social and economic phenomenon in full ascension, with a high contribution to the achievement and implementation of the European Union's strategic objectives regarding solidarity and prosperity (Buhaş, 2015). There are a number of new concepts generated by higher education, such as sports culture or sports space (Ilieş, Dumitrescu, Dragoş, &

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Buhaș, 2014). These concepts have been certified in the literature based on various research results (Bale, 1994; Maguire, 1995; Bale, & Vertinsky, 2004). The Olympic ideal of promoting sport in order to bond nations and cultures, and to promote and educate young people has materialized in Europe and has been supported by The International Olympic Committee and by The European Olympic Forum (Commission of the European Communities, 2007).

In this context, Romania has joined the European legislation on physical education and sport, compelling itself to organize and finance this system. The political measures in this direction (through legislative alignment with the European system) and increased European cooperation on sport require a broad support with a solid knowledge foundation. The quality, relevance and comparability of data need to be constantly improved in order to allow an appropriate strategic planning for taking concrete decisions in the sports field (Kozma, 2014).

Sport is an integral part of Romania's social, cultural and economic reality and also a factor for the consolidation of its image and international relations. The Romanian state must assume the mission of supporting and developing the National Physical Education and Sports System, and also, implicitly, of sport in higher education.

Sport is an attractive field for people and benefits from a positive image. However, the well-known capacity of the sports phenomenon to support physical activities in order to improve health (Lucaciu, David, Lucaciu, & Pop, 2014) is not fully used and needs to be permanently developed. The European Commission recommends the promotion of reinforced cooperation between the health, education and sports sectors in the ministries structures dealing with sport, in order to implement concrete health care strategies. In this situation, the EU recommends that Member States should know very well how to promote the idea of active life through national education and training systems, including through teacher training mechanisms. Sports organizations, including those from higher education, are encouraged to know and develop their own physical activity promotion system. Some universities have resorted to this by setting up their own clubs or sports associations (Dumitrescu, 2015). In this sense, the facilitation of information and good practice exchange is recommended and encouraged.

The result of some refractory policies, the lack of medium and long-term strategies in the field of sports (Buhaș, 2015) can directly affect the general health of the population, diminish the interest of practicing sport, and generate weak sports results at national and international level. .

In Romania, physical education is a discipline that has 2 hours allocated in the curriculum at gymnasium level, and only 1 hour at high school level. The low number of hours assigned to this discipline leads to irreversible effects among the population. The main objective of this activity (physical activity and movement education?) cannot be achieved in such a small amount of weekly hours. A superficial approach to this discipline leads to health deterioration among young people (Cristea, 2015). When higher education is considered, the picture is better but not significantly better. The structure of physical education and sport within higher education curriculum includes:

- Lesson of practical sports training: 2 hours per week
- Lesson of sports training: 1-3 training sessions per week
- Lesson of medical physical culture: 1-2 hours per week
- Internal sports competitions.

THE ORGANIZATION OF SPORTS ACTIVITY IN ROMANIA

Within the Romanian Ministry of National Education (MEN) sports activity is coordinated by the General Directorate for Pre-University Education, although it is the attribute of the Federation of School and University Sports. This Federation has a minor role in the financing and coordination of sports in higher education institutions. Organizational deficiencies cause a reduction in the number of pupils and students practicing a certain type of sports. Overall, sport in

higher education institutions is a non-functional system, gathering very few participants for the National University Championships. Sports clubs from higher education are mainly active in the championships organized by specialized Federations. There are no regular National University Championships and those that exist, are being sporadically organized, in numerically reduced disciplines, and exclusively based on universities` own option to participate. In 2016, the Federation of School and University Sports organized National Championships for 20 sports disciplines. These took place in only 10 university centers. From a total of 100 public and private universities, with or without accreditation (The Ministry of National Education, 2017), an average of only 20 universities participated in these events. In what regards sports games, the participation was extremely low, with about 5 universities participating (The Ministry of National Education, 2017). This low participation is surprising as team sports are known to contribute to the establishment and development of cooperative relationships (Orlick, 2008), a key objective for social and vocational cohesion.

Therefore, performance sport, both in the university and pre-university level, is an activity with many unknown organizational components. Unfortunately, the result of these problems is obvious and sad: a very small number of legitimated athletes take part related to the total number of pupils and students (Ilieș, Deac, Wendt, & Bulz, 2015).

The administrative disorganization is also reflected by the institutional organizational instability. Over time, the Ministry of Youth and Sports (MTS) went through a series of changes, returning, at the end, to the title of Ministry. The tendency to define it as a simple department emphasizes the minimal "importance" attributed to the sport phenomenon, ‘lumping’ sport with the much larger remit of Youth. This could reflect a lack of interest and capacity by the political factor, as well as the lack of vision regarding this important aspect. At the level of the Ministry of Youth and Sports there are 74 funded Sports Federations (the Ministry of Youth and Sports, 2017). Their poor collaboration with The Romanian Olympic and Sport Committee and the Federation of School and University Sports denotes the lack of organization and the disorientation of the sports structures at national level.

According to the Auditor's Report on Sportive Performance (Romanian Court of Accounts, 2014) there were reported to be 417 sports structures in Romania that existed as legal entities of public law, out of which 276 subordinated to the central public administration, as follows:

- 48 sports structures under the Ministry of Youth and Sports
- 220 sports structures under the Ministry of National Education (70 sports school clubs, 89 high schools with sports profile, 35 children's palaces, 29 higher education sports clubs)
- 8 sports structures under the subordination of other ministries

Table 1. The structure of the number of sports sections and sports officials
(Source: Annual report of the Romanian National Institute of Statistics, 2016 (*percent of the total population))

Year	Sports sections	Legitimated athletes	Coach	Trainers	Referees
2012	7919	246033 *1.29%	6822	6398	10878
2014	7314	243375 *1.28%	6861	5055	8852

There is an extremely small number of legitimated athletes. It can only be the result of an inappropriate organizational structure. As a result, this inefficient system finds impossible to gather a wide mass of potential sports practitioners, resulting an inefficient expenditure of its own budgets. There is a decrease in the number of legitimated athletes from year to year, the real value

being less than 1.28% legitimated athletes from the total population. This percentage is also caused by the growing number of foreign athletes active in Romanian championships, especially in team sports. These aspects cause a deterioration of the population health state, leading to higher mortality rates. As a consequence, budgets for medical treatments are increasing, while budgets for health maintenance tend to decrease. The decrease in the number of legitimated athletes and also of young sports practitioners is also caused both by the poor quality of sports arenas and by the lack of sports show in these arenas. There are no more role-models for young people to follow. Also, the related services are quantitatively and qualitatively limited and the sport industry in Romania is almost non-existent.

To illustrate the discrepancy between the number of legitimated athletes and the sports activities in which they operate, we have presented some significant values from some sports Federations in the table below. These were chosen due to their impact and importance in Romania. It can be noticed that football is different from other sports. Thus, half of the total number of legitimated athletes (about 120 000) is represented by football players. In countries such as France, Germany, Italy, Spain, and England amongst others, the number of legitimated football players exceeds several millions. European Union countries have a different approach in this sense: 40% of the active population is practicing sport, and an average of 25% is represented by legitimated athletes. It is not accidental that the budget allocated to sport by these countries is impressive, as well as the contribution to GDP (in Germany 17% of GDP is generated by the sports industry). Through its visibility and number of practitioners, football has become an important factor for increasing social cohesion and inter-human relations (Scutti, & Wendt, 2016).

Table 2. The structure of the number of sports sections and sports officials within main Sports Federations
(Source: Annual report of the Romanian National Institute of Statistics, 2016)

Federation	Year	Sports sections	Legitimated athletes	Coach	Trainers	Referees
Athletics	2012	252	7459	601	19	336
	2014	237	10135	601	19	336
Basket-ball	2012	243	17169	595	-	172
	2014	268	20170	504	-	144
Gymnastics	2012	45	985	165	4	67
	2014	39	1248	177	3	69
Handball	2012	227	10525	476	-	559
	2014	231	11514	481	-	601
Football	2012	3078	120520	1918	2715	5735
	2014	2535	117328	2277	1427	4419
Rugby	2012	93	4504	46	2	59
	2014	118	4879	200	-	96

The reduced number of legitimated athletes may be caused by a number of factors, among which we mention:

- lack of educational programs aiming to promote sport
- lack of sports infrastructure and its deplorable condition
- insufficient school hours allocated for physical education
- lack of sport management structures (sports associations)
- the teacher training system (coaches, instructors) is difficult and obsolete
- insufficient financing of sports activities

These factors, as well as multiple and major problems of pre-university and university sport, require an appropriate medium and long-term strategy, implemented with specialists able to radically change the approach to sport.

In 2004, the representatives of ministers from European Union countries, with responsibilities in the field of sport, adopted a chart of discussions that outlined the main themes of approaching sport within the Union. These themes are an integral part of the White Paper on Sport (Commission of the European Communities, 2007) and they should have been priorities for the specialized Committees of the Romanian Parliament. This should have resulted in the adoption of normative acts based on which sports activity can be harmonized with that of European partner countries. The European Union recommends and establishes through the European Commission White Paper on Sport collaboration between Member States, and settles also that this cooperation should take place in informal ministerial meetings, as well as in administrative meetings with executives responsible for sport.

Unfortunately, in Romania this area is treated also with indifference. The Romanian Parliament, as the specific structure empowered to issue laws, has delayed the correlation between its national legislation and the European one.

A particular importance is given to the "European sports model" by the countries with real interest in this area. Therefore, due to the fact that some sporting values and traditions generate the right and obligation to be promoted, based on the diversity and complexity of sports structures in Romania we consider that is both important and necessary to determine and present a sustainable and long-term system of sports organization. The objective of creating such a system is to highlight the organizational framework based on a common set of rules and principles that implies a good management of sports activity.

INFRASTRUCTURE

The Romanian national system of physical education and sports presents an insufficient and inadequate infrastructure that does not properly reflect the needs of sports activity. It is mostly out of function because 75% of the infrastructure is at the level of the 1980s. The Government did not consider important to invest in sports infrastructure. The infrastructure is inadequate and of poor quality. Poor results in Romanian sports emerge first of all from the precarious quality and the lack of sports bases. The legislative void and governments' (both local and national) disinterest has led to real estate businesses demolishing many sports bases in order to build residential areas. Notwithstanding this reduction in sporting facilities, those sports bases that have resisted over time are below the accepted level compared to the conditions offered to athletes in other areas of European society. This has been noted at national level as a problem: "The Ministry of Youth and Sports did not compile a Sports Base Register and did not pay sufficient attention to the certification of sports bases and their registration in the Register of Certified Sports Bases" (The Romanian Court of Accounts, 2014, p. 92). However, the sport phenomenon in higher education institutions is growing, but is restricted by the poor quality of the infrastructure and the small number of sports facilities.

HUMAN RESOURCES

The sports system in Romania is conditioned by the status and quality of the physical education teacher, coach and sports instructor. Low wages, poorequipment and the lack of perspective results in less and less youngsters opting for these professions. The conditionality of the curriculum generates blase teachers, with no initiative and implicitly a dysfunctional system.

Legislation

In the Romanian sports system, the legislation is extremely obtuse and simplistic and, as a result, it does not have the capacity to regulate this activity properly. Among the legislative gaps, we mention:

- Unregulated funding and below the required level
- Lack of regulations regarding the public-private partnership in sport
- Assimilation of sports service contract with the employment contract
- The existence of a balanced sponsorship law
- Directing reasonable amounts of money from the Romanian Lottery to sport
- A clear table with sports bases listed in a unique register.

OBSTACLES IN THE EVOLUTION

In the higher education system, as elsewhere , movement and sports promotion campaigns as a means of education are almost non-existent. The Romanian education system is deficient in promoting sport and physical education as part of the general education. In a system where sports practitioner`s motivation is almost non-existent, the promotion of physical activity as a way of life is limited. Information campaigns on the negative consequences of the lack of exercise and movement in daily activity are lacking. These gaps can have negative consequences on the population health state (Sopa, & Pomohaci, 2016).

In terms of funding, compared to other EU countries, Romania has one of the lowest financial allocations for sport. This also has an impact on sports activity at higher education level. But other factors that have led to a reluctance of the population regarding practicing sports activities can also be identified. For example, the limited budget allocated for sport and the recent economic crisis have reduced the financial possibilities of those who would like to practice sport (The National Council for Higher Education Financing, 2015).

Another cause is generated by the way funding is deducted and allocated in relation to the Gross Domestic Product (GDP) (Eurostat, 2016). Between 2000 – 2015 Romania`s GDP had an upward trend (with some fluctuations during the economic crisis). In 2000 it was about 100 billion euros, reaching 20 billion euros in 2015. We can deduce that in Romania there has been a continuous increase in revenues and incomes during this period. Unfortunately, investments in sports infrastructure have been extremely rare. This constant increase is not reflected in the funds allocated to sports, either. In 2015 the budget of the Ministry of Youth and Sport was of 82 250 112 million Euros, representing 0.052% of GDP (the Romanian National Institute of Statistics, 2016). Besides, to highlight the strategical lack, the Court of Auditors' Report in 2013 emphasized that the Ministry of Youth and Sports budgets were elaborated regardless of sports concrete financial needs. With the 0.052% of GDP allocated to sports in 2015, Romania has an average allocation of 0.87 euro/capita. In other European countries the budgetary allocations for the same activity range from 27 to 67 euro per capita (Andreff & Szymanski, 2006).

CONCLUSIONS

Physical education and sport are an integrated component of a balanced curriculum; there is a relationship of interdependence between sports and academic performances. Sport represents both formal and non-formal education and it generates and disseminates recognized social values, leading to motivation and knowledge development which is the preparation basis for the individual effort. Positive health and education are the consequences of systematically practiced sports activities, both at pre-university and university level. As such, it is felt that they must be developed and strengthened.

Through their social character, physical education and sport provide behavioural patterns that can be applied also to everyday life. They can be used as highly effective means to increase schools and universities` attractiveness and to reduce the risk of school dropout.

In order to have a good organization and overview of sports activities at higher education level, they must be institutionally developed through University Sports Associations, partnerships with the County Sports Associations, the National Sports Federations, the Romanian Olympic and Sport Committee and with the Ministry of Youth and Sport. Local and governmental authorities, through the commitments made at the European Union level, are compelled to sustain the participation in international competitions, organized by the International School Sport Federation (ISF), the European University Sports Association (EUSA) and the International University Sports Federation (FISU).

The existence of above mentioned international sports organizations facilitates the affiliation of national sports structures and establishes a structural link in order to develop joint sports practices and culture. International cooperation is the fundamental mean for developing common practices on physical education and sport in European countries. A result of these collaborations is represented by the EU White Paper on Sport, which provides guidelines for the European Commission`s activities in this field.

Sport shows once again that it has a remarkable potential in promoting and supporting education, both in the academic environment and in peoples` everyday activities.

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A THEORETICAL AND PRACTICAL -METHODICAL APPROACH TO PRIMARY SELECTION IN BASKETBALL

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Abstract: The selection is a systematic and continuous process by means of which the specialists aim to identify children with special skills for practicing certain sports, on the basis of certain biological and psychological criteria. It operates continuously and simultaneously to the training process starting from beginner level up to high performances, and implies a set of periodical evaluations intended to emphasize the child's skills to successfully practicing a sport. The selection is a permanent process and is of the utmost importance, since the value of the athlete and implicitly of the team's subsequent performance depends on the quality of such selection. A good selection organization and running shall facilitate the discovery of the children with the highest potential. Otherwise, the coach shall invest work, time and knowledge in preparing certain athletes who later on, upon transition to senior level, would not obtain expected results. The performance is originated in three main sources: athlete's biological and personality value, the intellectual value expressed by the specialists' body managing the training pattern programming, and time. Within this triptych, time is a constant, while the other two sources are variable.

Key words: selection, selection criteria, performance,

* * * * * *

INTRODUCTION

The concept of selection has been used, at first, within an economical-social type action and has been scientifically substantiated ever since the beginning of the 20th century. In order to precociously diagnose professional aptitudes and talent orientation towards one profession or another, various tests and methods would be used to the purpose of highlighting manual dexterity, correct and quick reception and learning of several motor scenarios. Due to its not being a clearly outlined concept, sport selection would only suggest the beginning of a sport training action which, along the years, has experienced various forms of expression, from early specialization, standing for the preoccupation to guide the child towards a sport at a very young age, to

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precocious initiation in the ’60s, thus reaching the concept of primary selection implying the beginning of the child’s sport organized activity in specialized centres, as a consequence to the performance of certain anthropometric, sanogenous measurements and of successful tryouts.

In Romania, the institutionalization of the sole selection and training system of children and juniors took place in the year of 1976, such action being preceded by the analysis of the national and international level accumulated experience. An ideal champion model was described for each sport branch. This is called the body-build biotype and is characterized by certain motor, physical and behavioural specific qualities. The selection uses a complex system of criteria in order to identify subjects that are the closest to this ideal (Nicu, 1999).

The MTS Research Centre and the Institute of Sports Medicine have elaborated together a complex system of subject testing and, as a derivative therefrom, a system of criteria and requirements that are unitarily applied within the actual activity of children selection, which provides certainties concerning the aptitudes for practicing a given sport branch.

The selection was defined as a *“systematic activity to be performed on the basis of certain criteria, tests and tryouts, to the purpose of identifying and guiding subjects with aptitudes above the population average towards the practice of a certain branch of the high-performance sport”*. (Dragnea et al., 2007). The specialists (Nicu, 1993; Dragnea, 1996) agree that sports selection is a process of identifying children with special aptitudes for the practice of various sports or sport branches that is carried out on the basis of certain biological, social-psychological and motor criteria, having a scientifically rigorous, organized and continuous nature (Oncea et al., 2015).

This system blends a multitude of criteria into a unitary whole, that operate in a predetermined order as imposed by a practice-verified methodology, and the selection action is attended by an interdisciplinary team of specialists, each member thereof acting in accordance with the strictness of the measurement and evaluation instruments.

AIM

By identifying the main aspects of the basketball primary selection performance method, we hope to be of help to young coaches by providing a theoretical clarification that is absolutely necessary for the success of such action.

OBJECTIVES

Our goal through this study is to present, from our point of view, the main aspects relating to the preparation of the selection operation, the activity of the teacher-coach in the schools included in the selection scope, the activity at the selection competition itself, as well as the ways of maintaining and increasing motivation for practicing basketball.

From the didactic, operational, biological and sport perspective, we recommend the selection approach on three levels or stages: primary, secondary and final. In this paper, we shall refer only to the issues relating to the first stage including the age period of 4-5 years and up to 8-10 years.

PRIMARY SELECTION (stage I)

This stage is intended for the initiation in the envisaged sport and has the objectives below (Dragnea, 1996):

- attracting and finding talented children for the sports activity;
- developing children’s motor capacity;
- harmonious physical development of the children and, simultaneously, acting on muscle groups that are frequently stressed by the sport branch in question;
- developing motor skills;
- initiation into the base technique of the sport concerned;

- gradual preparation of the children to the purpose of attending competitions, in order to get used to competing requirements;
- education of moral and sport ethics traits.

If depicted from a large mass of tested children and young people, the exceptional talent must be engaged in a considerably intense activity, a long-term no sparing work, pushing the maximum biological and psychological limits. Analyzing the two aspects, namely the talent and the work capacity, which are absolutely necessary in order to reach exceptional performances, we may state that they form an integral part of the training process substantiating it (Todea, 2006). In our opinion, when determining the algorithm used in basketball primary selection, we must address the following issues:

- what are the characteristics of the effort in basketball;
- what are the modern orientations manifested in a basketball game;
- which are the progress determining factors;
- which is the optimal selection age;
- what must the ideal (modern) basketball player look like;
- selection criteria;
- selection tryouts (including scoring system);
- primary selection performance modalities;
- ways of maintaining and increasing motivation for practicing the chosen sport branch.

SELECTION CRITERIA

The *genetic and anthropologic* selection criteria are basically outlined in the medical – sports history (which includes both personal and family-related antecedents), the cultural and educational level, the attitude of parents and children towards sport, etc.

Sanogenesis remains the criterion of the highest stability along various selection stages. The *physique/body-build biotype criterion* intervenes in the selection in a new vision thereof: somato-physiological, motor, psychic, biochemical. *Neuropsychological and neuromuscular criteria* also intervene in the selection process, and it would be ideal if they were applied upon the primary selection level. The *endocrinology – metabolic criteria* are useful both within the initial selection and also particularly within the secondary, puberty selection. The *cardiorespiratory criteria* have the utmost significance for most of the sport branches of a predominantly dynamic nature. There are also *radiological criteria* deemed useful for the selection. The selection criteria and standards relating to women's sports have their particularities as well.

Lowering the optimum age for high performances has proven that the motor test alone cannot stand for an optimal and all-embracing solution for the selection action. The biological and psychic regularities of the modern sport training and competition have claimed the identification of the subjects that may provide, by their genetic base, health state, body vital functions and organs' adaption potential, drive, temperamental and character particularities, the entirety of qualities required by great sport performance.

The level of future players' performances reflecting on the results of the team shall depend on the very quality of the initial selection. Therefore, it is imperative that the coaches know the basketball game specific selection criteria and tryouts very well and adjust same to the material conditions and possibilities available to them (King, 1998).

As a starting point, the coach must be aware of the factors facilitating performance in basketball, whether we refer to somatic, motor or functional factors. The future basketball players should have these qualities at the highest level possible, the exigency of the selection being rather high particularly when it comes to qualities under a strong genetic determination (somatic sizes, motor qualities such as speed, handiness, vertical). The goal of basketball primary selection must

be, in our opinion, to select the fastest and the handiest children, who have the potential to increase height and grow taller than the average, in adult state.

According to modern training methodology, the current trend is to work on formative levels, more precisely it is advisable that a technician be specialized on one preparation/training level (selection – initiation, juniors, II, II, I). Considering such assumptions, as well as the material/financial possibilities existing in most of our sports clubs, we propose the following selection criteria:

1. **Somatic criterion**

Anthropometric type evaluation

As far as the anthropometric criterion is concerned, it is rather difficult to formulate a doubtless prognosis regarding a child's subsequent physical development, but the coach has several assessment criteria at disposal. The highest relevance in achieving high performance in basketball lies in the longitudinal sizes of the body and segments thereof: body-build, palm spread and length. According to Brugsch's classification, the basketball player must fall under the category of hyper tall people, at the adult age (Teodorescu, 1979). Amongst the multiple morphological parameters, the following play a decisive influence on the selection process:

- **Height** (stature) the subject is going to reach during various moments of his/her growth, may be foreseen by using the percentage relation existing between the country - level height average at the age of 18 and the country-level height average per each age between 10 and 18 years of age (table no. 1).

Table no. 1 Percentage values regarding final height reached at various ages
(Source:*Criterii, probe şi norme pentru selecţia în baschet,* 1986)

At 17, the height of the boys stands for 99.47% of their final height				
"16"	"	"	"	98.01%
"15"	"	"	"	95.28%
"14"	"	"	"	91.26%
"13"	"	"	"	87.18%
"12"	"	"	"	84.82%
"11"	"	"	"	80.95%
"10"	"	"	"	78.21%
At the age of 17, the height of the girls stands for 99.87% of the final height.				
"16"	"	"	"	99.56%
"15"	"	"	"	99.05%
"14"	"	"	"	97.67%
"13"	"	"	"	95.35%
"12"	"	"	"	91.83%
"11"	"	"	"	87.75%
"10"	"	"	"	84.38

In reference to the same matter of height forecasting, after the age of 15 a series of medical tests may also be carried out, such as:

- "sella turcica" imaging;
- imaging of the growth cartilages of the forearm distal extremities;
- sexual maturity extent;
- GH (Growth hormone) plasma dosing;
- insulin tolerance test.

The specialized literature emphasizes also the contribution of the hereditary factor to achieving a certain height when adult. During his heredity issue approach, Mendel asserts that the

transmission of certain traits to descendents is made "cross-like" against the gender thereof. For example, taller little girls usually have tall fathers and short or average height mothers.

- Arm span or **reach** must exceed, on basketball players, the sizes stated by Mayet and Godin for regular human beings of identical stature or age (Teodorescu, 1979). It is recommended that at the age of:

13, the reach should stand for 103% of the subject's height
16 " " " " " 105% " " " "
18 " " " " " 106% " " " "

- **Palm length** which must be higher than that of a normally developed subject (104% of the body height), since basketball requires having a larger palm (Teodorescu, 1979)

2. Motricity criterion

The criterion consists of a series of tests that must:

- emphasize the presence of the qualities required for basketball practicing;
- be adjusted to age particularities of tested children;
- be in accordance with available financial possibilities.

We propose the following tryout elements for motor function evaluation:

- **Speed**

The test consists of a 20 m standing start speed running. The test is repeated twice. The indicative values suggested by the specialized literature are between:

3.2 seconds – 4.5 seconds (baby-basketball category – 8 to 10 years of age);
3.2 seconds – 3.8 seconds (mini basketball category – 10 to 12 years of age).

- **Handiness**

We propose the use of the *"shuttle (potato picking)"* test, from the well-known *"Standard Fitness Test"* of the International Federation for Physical Education, measuring a very important quality for a future basketball player, namely agility. The reference values fall between:

17.9 seconds (for 30 points) and 11.7 seconds (for 80 points) – for children aged 6;
15.4 seconds (for 30 points) and 8.9 seconds (for 100 points) – for children aged 7.

- **Lower limbs explosive power**

We use the long jump from standing fixed position, the values falling between:

137-147 cm (for 50 points) and 149-159 cm (for 70 points) for boys aged 7-8;
137-152 cm and 146-160 cm for the same score for girls.

3. Health state criterion

The health state criterion shall have elimination relevance. All criteria are evidently relevant, but from several children having a good state of health and functionality, we shall prefer those who, given a superior motor function, present a physical development corresponding to the practice of the sport in question.

4. Psychological selection criteria

We believe that it is absolutely mandatory to know psychological particularities of the subjects involved in the selection procedure, respectively the correspondence thereof to a series of requirements relating to high performance activities (Rodrigues, 2005). The champion model must be seen through the image of the personality structure thereof (Tudos, 2000).

The study of personality traits and the physical development of selected children is a long-term process taking place after the actual initial selection. Besides knowing possible personal and family-related pathological antecedents, same may also be identified by means of joint activities (training sessions, trips, competitions, training camps), as well as through discussions with the children's school teachers.

affectivity

- cheerful, gentle, introvert, aggressive;
- degree of emotiveness, shyness or courage;

- attention or lack of attention;
- seriousness, discipline, modesty;
- capacity of adaptation to sporting environment;
- sociability, level of group adherence.

willpower

- attitude towards permanently increasing demands in the training process, as well as the stress generated by the training and competition conditions;
- eagerness, struggle for victory, determination, stout-heartedness or resignation, carelessness;

memory

- visual, auditory;
- capacity to reproduce certain motor acts, combination, coordination or succession thereof.

imagination

- vivid, rich or poor;
- contribution of intuition, representations and suggestions (*Criterii, probe şi norme pentru selecţia în baschet,* 1986).

SELECTION ACTION PREPARATORY ACTIVITIES

1. determination of the age and the number of children to be selected;
2. determination of the criteria and the tryouts types (the financial/material base shall also be considered);
3. determination of the team of coaches (teachers) to participate in the actual selection procedure, distribution of responsibilities and training there of;
4. determination of the selection areal (depending on the gymnasiums/sports halls' proximity, etc.).

ACTIVITY IN THE SCHOOLS INCLUDED IN THE SELECTION PROCEDURE

1. establishing the connection with the school principal/management staff;
2. establishing the connection with the physical education teachers or the elementary school teachers;
3. attending physical education classes or performing visits to proposed classrooms for selection purposes;
4. choosing the children for the selection contest (depending on the anthropometric criterion, the motor criterion or the information provided by the elementary school teacher in reference to parents' stature, etc.);
5. distributing invitations for the selection contest/tryouts.

ACTIVITY RELATING TO THE ACTUAL SELECTION CONTEST

1. Prior organization of the activity (materials, markings, tasks for the team of specialists: who performs table registration, who carries out measurements, who is in charge with timing, which is the order of tryouts, etc.).
2. Participants' table registration (optionally we may also evaluate the estimated height of the parents);
3. Tryouts and insertion of the results in the related table.
4. Results processing (according to standardized tables or own scaling).
5. Communication of the results and of the training schedules.

OTHER MEASURES

1. Popularization of the selection action (in the media, on the Internet, posters posted in the schools included in the selection scope).
2. Entering into partnerships with the respective schools.

WAYS OF MAINTAINING AND INCREASING MOTIVATION FOR PRACTICING BASKETBALL

These may be applied already from the first year of training:

• competition (of a friendly, official or training nature) - weekly games with teams from other schools or between teams of the same group;
• growing attachment and love to the colors and tradition of the club, the feeling of belonging to the club;
• drawing up and displaying monthly / quarterly / annual rankings for: the most disciplined athletes, the best defender, etc.
• end of year awards for: the best training session attendance, the best defender, the best shooting guard, etc.
• participation to competitions in other localities, combined with touristic and cultural sightseeing, etc
• demonstrations (relays, technical circuits, throwing contests, ball handling demonstrations, demonstrative games) held before the games or during the recesses of Division A games or of other sports competitions;
• group watching of top-level competitions (school division, division A, international games) and commenting on them;
• homework tasks ("invisible training");
• presentation by the coach of models of great champions in basketball or volleyball;
• training with the participation of committed well-known athletes or top-class athletes;
• various prize awarding (of a symbolic nature) upon training completion.

CONCLUSION

We can state that the weighing factor for obtaining high performances is assigned to selection–up to 70% according to some specialists, with the remaining 30% assigned to the training process. It is obvious that scientific selection is the key to performance in contemporary sport (Anastasi, 2011). A scientifically conducted, performed and continued selection on the initial - secondary - ending interval, shall determine the superior valences of the training process and this, in turn, shall contribute to the optimization of future selections.

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