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Psychomotor Capacities In The Dancesport Training

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Abstract

The aim of the research was to develop and experiment programs specialized on optimization of the psychomotor capacities in training dancesport athletes through rigorous calendar planning.

We set our sights in our approach, to highlight the importance of psychomotor skills involved in the training specific to the dancing sport, respectively the way in which the higher level of development and expression are reflected in performance of our athletes. Furthermore, we identified those components of the psychomotor capacities that are most relevant in dancesport, so that the planning of subsequent training will take into account these.

We determined the psychomotor capacities of 24 subjects, 12 girls and 12 boys aged 12 to 13 years with a special test profile for dancesport. In a prospective study, the effect of one year comprehensive psychomotor capacities training program was revealed with a test profile developed for this investigation.

Data analysis revealed a significant progress in final testing compared to the initial testing, in terms of evolution of the components of the psychomotor capacity that were assessed.

This is explained by efficient development of psychomotor capacities optimization programs, in which we used rationally both methods, the specific operating structure and the borrowed exercises from other sports, in correlation with the age particularities of our subjects and with the characteristics of the different stages of the training plan.

Also, in the case of dancesport-specific tests, developed for each component of the psychomotor capacity, the differences recorded between the two tests were strongly significant, highlighting, on the one hand, the opportunity to use borrowed exercises from other sports in the training, and, on the other hand, the importance and role of psychomotor capacity in a superior technical expression.

At final test, for all samples and tests used, the subjects of the research obtained statistically confirmed results, which demonstrates that at the end of the experiment, the program we have imposed proven efficiency.

Keywords: dancesports, psychomotor capacities, training

Introduction

The connexion between mental and motor function and its development among interdisciplinary sciences, was named psychomotricity, being considered as the result of the integration of mental and motor functions, following the development of the nervous system, which points out the relationship of the subject with his body and with the environment.

Psychomotricity - „complex expression of the interrelations between mental and motric processes, that assure the information reception and processing, as well as the transmission paths for the correct execution of the response” (Motef, 2001).

To Epuran (1976) psychomotricity „appears as a capacity, and also as a complex function of adjustment of the individual behavior. Consequently, it includes the contribution of different mental processes and functions that ensure the reception of the information as well as the appropriate execution of the response act”.

It is well known in the specialized literature the fact that in the case of psychomotor abilities, the involvement of the superior nervous sections in the voluntary motor responses is of great importance, providing them superior quality indicators. As opposed to the other conditional qualities that give the content of the movement or its energetic value, the psychomotricity can be seen as a game of the mental and of the motor function, giving the fair dosage, the value of the intelligence and of the appropriate movements.

As there isn't any exhaustive clasification of psychomotric abilities, concerning the number, the structure or the component correlations, we took into account the highlighting of all points of view registered in the specialized literature, approach that was useful in the guidance of the preparation of our athletes.

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Psychomotricity components (elements):

- kinesthetic sensibility;
- sense of balance;
- sense of rhythm and short duration appreciation;
- body parts coordination – homolateral or contralateral;
- eye-hand or foot coordination;
- general coordination;
- agility;
- movements precision and stability;
- assessment of the suitability of actions in different moments of time;
- laterality;
- body scheme.

Sports dance reveals by the steps perfection a world of symbols, a gesture loaded by significance, which obeys the most subtle laws of biomechanics, consisting of a set of steps and figures executed with high degree of technicality and an artistic component of great complexity and spectacularity, involving the interaction and coordination between the two partners, put together on a musical accompaniment specific to each dance. Steps and dance figures are ordered in choreographies that run on spatio-temporal coordinates, musically imposed and the existence of several pairs on the dance floor.

The importance of psychomotricity capabilities lies in influencing the learning and improvement of new motor acts and their stability over time; promoting the efficient execution of acts and actions in various conditions; execution of movements in optimal rhythm and tempo; favoring the superior capitalization of other motor skills; and favoring the restructuring of the movements in the phases of high-performance training and in improving basic and applicative motor skills.

In the following we wanted to take into account the importance of balance in sports dance.

Sports dance equilibrium

Equilibrium capacity helps maintain the stability of executions, keeping the body in a balanced position, being responsible for restoring balance to high-difficulty figures, the role of the vestibular analyzer being very important.

The body of a dancer is considered to be in balance when the center of body mass falls on the support surface of the body and the sum of forces acting on the body must be equal to zero. Body mass represents the totality of the substance from which the body is made and the center of body mass in orthostatism is at the intersection of medio-frontal, medio-sagittal and medio-transversal planes. Any change in position by moving the body segments other than normal in orthostatic position causes a change of the center of mass on the support surface. Any movement of the center of a dancer's body beyond the support base causes the movement, meaning dancing movement. The dancing movement is made by alternating the movement of the dancer's center of gravity beyond the support base and re-equilibrium by providing another base for the new body center. The stability of the dancers is related to keeping balance during their performance. The complexity of the movements in the sports dance is given by the combination of the static and the dynamic ones.

Methods**Procedure**

The experiments took place between 2015-2016, according to the preparation plan with 4 practices by week and competitions in the week-ends.

The preparation tools for our specialized programs were adapted from other sport sectors and they were based on the compliance with the following criteria: ensuring the multilateral development of athletes; to contribute to the development of basic motor skills (strength, speed, strength, coordination capacities, flexibility-mobility, etc.); to enrich the luggage of motor skills and abilities, to get closer to the technical specificity of each dance and of course to contribute to the development of general psychomotricity.

The models of specialized programs were used during the training of 12-13 year-olds athletes, during the preparatory stages, in the general training stages, when developing the overall effort capacity (by large volumes). We have also taken into account the mixed methods that are on the border between the general training and the specific training and have emerged from the need to meet certain objectives of the lessons or microcycles aiming to learn or correct complex technical elements which can not be fully addressed.

Subjects

Our research was conducted on 24 subjects (12 boys and 12 girls), aged between 12 and 13 years, among them 16 were members of the Galati Sports Club, 4 dancers of the Braila Sports Club and 4 athletes from Buzau Sports Club, all of them being involved in the competition system of the Romanian Dance Sport Federation.

Research methods

In order to assess the psychometric abilities we used the Bass Test for dynamic balance and the test for sports dance (from a support base to another) made up of dance-specific structures, which is a personal contribution.

Dynamic balance – *Bass test* –

The subject stands with the right foot on the starting point (mark) and then jumps on the first mark with his left foot and tries to maintain the static position for 5 seconds. The subject will continue alternating the legs by jumping and holding the static position for 5 seconds until the route finishes. The tip of the sole (ping) must completely cover the mark so that it can't be seen. Good performance consists of covering each mark with the ping without touching the floor with the heel or other part of the body and keeping the static position for 5 seconds, covering each mark. 5 points are given for each landing and mark coverage and one point is added for each second of maintaining the static balance. A subject can get a maximum of 10 points for each mark, or a total of 100 points for the complete route. Each of the 5 seconds of the balance-keeping attempt will be loudly counted with a point given to each second and recording the score (s) for each mark. The subject is allowed to rebalance, trying to keep the balance for 5 seconds after correct landing.

Materials: a stopwatch or a watch with secondary, 11 marks of 2.54 cm x 2 cm (can be made of gummy or leucoplast paper) and a metric tape.

Specific test

Balance test –stop of athletes in supporting bases at the time required by the examiner. Test description and applying instructions:

On a Slow walse, the couple dances in a dancing position with a "gold choreography":

1. Right Turn, (times 1,2,3 4,5,6)
2. Close Change Natural to Reverse, (times 1,2,3)
3. Reverse Turn, (times 1,2,3 4,5,6)
4. Close Change Reverse to Natural (times 1,2,3)

Music will be stopped by the examiner in unexpected moments and athletes must reach the immediate next support base where they will remain in position with the technique specific to the step until the music is resumed and the athletes will re-enter choreography from the next time.

The performance of "Gold Choreography" will begin immediately after the musical phrase (times 1,2,3 2,2,3 3,2,3 4,2,3).

The examiner will stop the music on 2 musical measures counted from the beginning of the first figure of the "golden choreography" or "Right Turn", the second stop will be at 1 musical measure, then 1 musical measure and the last at a difference of 2 musical measures.

Music will be stopped at the time set by the examiner (1, 2 or 3) as it follows in the three parts of the test presented below. The free time between the parts of the test is 30 seconds.

Time : 2 minutes

To comply with the technical principle of execution, the descent will be done at the end of time 3.

First part-testing the balance on time 1 (Fig. 7.2.).

The athletes must reach and stop their weight in the support base from time 1, the music will be stopped by the examiner on time 3.



Figure 1. – Balance test on time 1

Execution technique:

The stop will be made with the weight on one leg, the athlete that is moving forward will gather the leg without load next to his base leg. The athlete that is moving backwards will have the free leg ready to move at 15-20 cm far from the base leg.

The supporting leg of both athletes has as base the whole foot and the leg without load of the athlete moving forward has the heel lifted.

Evaluation and grading criteria:

The work must be done in balance, stability and equilibrium.

Penalties on items and moves, one 1 point from 10 is deducted if:

- athletes do not stop at the time chosen by the examiner;
- the athlete moving backwards does not prepare the leg at 15-20 cm;
- the forward-moving athlete does not have the support leg on the sole and the starting leg with the raised heel;

- contact between partners is lost;
- they lose balance.

Second part – Testing balance on time 2 (fig. 7.3.).

Athletes must arrive and stop with weight on the support base on time 2, music will be stopped by the examiner on time 1.



Figure 2. Balance test on time 2

Execution technique:

The stop will be on the support leg, base on the ping, the free leg will remain in the back at a distance of 15-20 cm in the case of the moving forward athlete, and the one who moves backwards will have the free leg in the front at 15 - 20 cm from the support leg.

Evaluation and grading criteria:

The work must be done in balance, stability and equilibrium.

Penalties on items and moves, one 1 point from 10 is deducted if:

- athletes do not stop at the time chosen by the examiner;
- athletes do not stop in the support base on the ping base;
- the one who moves backwards does not have the moving leg in front at 15-20 cm;
- the forward-moving athlete does not have the moving leg at 15-20 cm in the back;
- contact between partners is lost;

Part three - testing balance on time 3 (Fig. 7.4.).

Athletes must arrive and stop with weight on the support base on time 3, music will be stopped by the examiner on time 2.



Figure 3. Balance test on time 3

Execution technique:

The stop will be done with the weight on one foot, entire sole in contact with the floor and the opposite leg will have no weight, in the case of the athlete that moves forward, the weightless leg will be positioned next to the raised heel leg and the one who goes backwards will have the moving leg ready in the back at 15-20 cm away from the support leg.

Evaluation and grading criteria:

The work must be done in balance, stability and equilibrium.

Penalties on items and moves, one 1 point from 10 is deducted if:

- athletes do not stop at the time chosen by the examiner;
- the one moving backwards does not prepare the moving leg at 15-20 de cm;
- the one moving forward does not have the support leg on the whole sole and the moving leg with the heel lifted;
- contact between partners is lost;
- they lose balance.

Results and discussions

Analyzing the results obtained by the subjects of our study, we can highlight the differences between the averages recorded in the final testing compared to the initial testing as a result of our training program, these results being supported by the statistical analysis that showed a significant difference.

Thus, the average of the Bass test values in the final test is 13.69 points higher than the average of the values in the initial testing (81.87-68.18), which shows that the means used in the training program have contributed to the considerable improvement of the dynamic balance. The statistical analysis shows a significant difference, the value of t between the two tests being 9.41 at a significance threshold of $0.00 < 0.05$.

Table 1. Comparative results obtained by athletes in tests in the final experiment assessing the psychomotor skills

Tests	Statistical indicators (n=16)								
	T.I. $\bar{X} \pm m$	T.F. $\bar{X} \pm m$	Medium differences	Ab.st. T.I T.F	C.V T.I T.F	T St.	T table Fisher	p	Significant/ insignificant at p=0,05
<i>Bass Test</i>	68.18±1.66	81.87±1.98	13,69	6.65 7.95	9.76 9.71	9.41	2.94	0.001	significant

In the balance-specific test, our subjects recorded an average of 6.87 on their initial testing, improving their performance at this assessed component by an average of 8.25 by the final testing. The statistical analysis shows that the difference between the averages is statistically significant because t has the value of 2.35 at a significance threshold of 0.03 <0.05, which justifies us to assert that our programs for the optimization of the coordination capacities were efficient.

Table 2. Comparative results of athletes at the specific tests from the final experiment assessing the psychomotor skills

Specific tests	Statistical indicators (n=16)								
	T.I. $\bar{X} \pm m$	T.F. $\bar{X} \pm m$	Medium differences	Ab.st. T.I T.F	C.V T.I T.F	T ST.	T table Fisher	p	Significant/ insignificant at p=0,05
<i>Balance test</i>	6.87±0.2 5	8.25±0 .54	1,38	1.02 2.04	12.42 24.84	2.35	2.13	0.003	significant

Conclusions

Following the processing and interpretation of the results, significant progress was made in final testing, compared to the initial testing, with respect to the components of the assessed psychomotor ability. These results can be explained by the effective development of psychomotric ability optimization programs, were we rationally used both specific operational structures and borrowed means from other sports branches, in correlation with the age specificity of our subjects and the characteristics of the various stages of the training plan.

Also, in the case of sports dance-specific tests developed for each component of psychomotor ability, the differences between the two tests were strongly significant, showing, on one hand, the opportunity of the specific means but also of the borrowed means from other sports branches in training, and on the other hand, the importance and role of psychomotor ability in a higher technical expression. In the final testing, for all samples and tests used, the subjects of the research obtained statistically confirmed results, demonstrating that our training program was proven effective.

Given the fact that these psychomotor skills have a strong genetic determination as well as their importance in the achievement of the specific sports dance motor-actions - revealed by the experts, but also by the results of our research, we consider that these psychomotor skills must be a selection criteria for children who want to practice sports dance at a performance level.

Starting from the results of our investigation, we consider an effective approach within a training year of coordinating skills at this age, which would have real chances of success in other age groups, especially in children (6-11 years). It will also act on the development of general coordination skills as well as on the sports dance specific components of the coordination skills.

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Assessment of the Eating Habits of a Lot of Students from the Sports High School Program in Iasi County

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Abstract

Nutrition is an external factor contributing to the health of young people, and it is essential for those who practice performance sports. **Material and methods:** The study was carried out on a group of 150 students from a Sports High School in Iasi. There are 76 young people in the 9th grade and 74 pupils in the 11th grade. Students completed a weekly food frequency questionnaire. **Results and Discussion:** Morning food intake is present in only 66.00% of cases. There are 34.00% young people who will do their morning workout without ingesting the minimum energy requirement. Dominant milk consumption is once (29.33%) or 2-3 times (39.33%) per week. Eggs appear in menus especially 2-3 times per week (44.00%). Cereals are present in menus especially once (42.00%) or 2-3 times (33.33%) per week. Potatoes are mostly consumed once (37.33%) or 2-3 times (38.00%) per week. For all the studied foods the differences calculated by class are statistically insignificant, a worrying result because the necessary daily intake gradually increases with age and with the increase in physical effort intensity. **Conclusions:** The results obtained are not encouraging because food group intake is deficient, which can lead to decreased exercise capacity.

Key words: physical activity; weekly food intake.

Introduction

Food is a major contributor to maintaining the health of children and young people. Its role is even more important in the case of young people who practice high intensity physical exercises. This is the case with high school students who are training to become athletes. For these young people, ensuring a balanced diet is an essential condition for increasing sports performance levels, but also for maintaining health. Balanced nutrition should ensure an adequate intake of micro- and macronutrients. In a typical person, protein will account for 10-14% of total energy intake, lipids account for 20-35% and carbohydrates 50-60%. In performance athletes it is necessary to adapt the contribution of macronutrients to the needs of the training, competition or recovery period (Rousseau & Cascua, 2005).

The recommendations made by specialists in the field vary from one country to another, depending on the sex and the type of sport practiced. In Hong Kong for elite athletes we recommend a 51% carbohydrate intake, 16% protein and 32% lipid. In China for male elite athletes, 38% carbohydrates, 20% protein and 43% lipids are recommended and for women, 38.5% carbohydrates, 21% proteins and 45.5% lipids. In Australia for elite athletes the recommendation is 54% carbohydrates, 17% protein and 28% lipids. In Ireland for men, the recommendation is 43.8% carbohydrates, 15.5% protein and 40.7% lipids, and for women 45% carbohydrates, 14.9% protein and 40.1% lipids (Hima B.M., Meenu D. & Priti R.L., 2017).

Proteins are needed for balanced nutrition of the athlete because they contribute to increasing the rate of muscle mass synthesis and maintaining the balance of nitrogen at normal values. For athletes who aim to increase muscle mass, it is important to ingest proteins because they will ensure a balance between synthesis and oxidation (Martin & Tarcea, 2015).

There are discussions about the carnivorous or vegetarian diets recommended to athletes. Experience shows that there is a stronger muscle contraction, but which is depleted more rapidly in carnivores and a less powerful contraction that lasts longer in vegetarians (Apfelbaum, Romon & Dubus, 2004). Carbohydrates present in vegetarian diets ensure the glycogenic reloading needed for endurance efforts, while meat-based diets provide creatinine, which is a precursor of ATP and favor strength/high-intensity efforts (Rousseau & Cascua, 2005). Lipids are also used as a source of energy, especially unsaturated fatty acids.

It is important to be aware of the correlation that exists between the person's somatotype and his/her motor skills. Girls with sthenic or asthenic somatotypes have an advantage over hypersthenic ones in terms of motor skills: higher

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strength and endurance in muscles of upper extremities; higher strength and faster contraction speed of flexor muscles; increased strength of the lower extremity muscles; a better general resistance to physical effort (Kolokoltsev, Iermakov & Prusik, 2018).

Objectives of the study: evaluating the nutrition of the students; knowing the eating habits of the pupils according to the grade they are in; the assessment of changes in nutrition that appear / do not appear according to the age group of students (depending on the characteristics of the growth process); assessing changes dietary changes that occur / do not occur, taking into account their sex (starting from the idea of different body composition depending on sex).

Material and methods:

The study was carried out on a group of 150 students from a Sports High School in Iasi. There are 76 pupils (50.66%) in the 9th grade and 74 pupils (49.33%) in the 11th grade. Also, the studied group consists of 86 male (56.66%) and 65 female (43.33%) young people. Students completed a weekly frequency questionnaire on food consumption. It is a questionnaire that provides information about the eating habits of the student. Eating breakfast and weekly intake of milk, cheese, eggs, bread, cereals and potatoes were quantified. Response variants for eating breakfast are: yes - no, and for the weekly food intake of the above mentioned products are: zero; 1 time; 2-3 times; 4-6 times; daily. In the case of bread there is a second question, namely “How many times per day do you eat bread?” with the following answer variants: 1 time, 2 times, 3 times, 4 times, more than 4. This question is important because if pupils eat bread 2-3 times per week and when they do they eat it only once per day then they cannot cover their nutritional needs.

The results will be processed based on school year (grade) and the sex of the students, using Pearson’s CHI squared test.

Results:

The study focuses in three directions, namely: eating breakfast in the morning, eating animal products (milk, cheese and eggs) and eating products of vegetable origin (potatoes, bread and cereals).

On the day of applying the questionnaire, 66.00% of young people ate breakfast. Our attention is drawn to the 34% of the remaining students who will undergo a sustained physical effort in the morning without covering the energy requirement of the body (Table 1).

Table 1. Eating breakfast

“Did you eat breakfast?”	Yes	No	Total
	Distribution based on school year		
9 th grade	52	24	76
11 th grade	47	27	74
Total	99	51	150
%	66.00	34.00	
Distribution based on sex			
Masculine	58	27	85
Feminine	41	24	65

In the 9th grade there were 31.57% negative responses whilst in the 11th grade there are 36.48% negative responses. The calculated differences are statistically insignificant ($p > 0.05$, $f = 1$, $\chi^2 = 0.383$) and show a similar situation related to the absence of food intake in the morning. By sex, the results change from 31.76% of boys who do not eat anything in the morning to 36.92% of girls who go to school hungry. The calculated differences are statistically insignificant ($p > 0.05$, $f = 1$, $\chi^2 = 0.435$) and highlight the existence of similar eating habits in the questioned students.

The studied animal products are milk, cheese and eggs. We will insist on weekly milk intake due to the existence of a national program called "milk and roll". In the questioned students, the dominant milk intake is 2-3 times per week (39.33%) or once per week (29.33%), which is totally inadequate. A result consistent with rational nutrition rules occurs only in 11.33% of cases where the “daily” response is chosen. The answer “4-6 times” per week is also acceptable and is present in 9.33% of cases (Table 2).

Table 2. Weekly milk intake

Weekly milk intake	Zero	1 time	2-3 times	4-6 times	Daily
Distribution based on school year					
9 th grade	10	22	30	6	8
11 th grade	6	22	29	8	9
Total	16	44	59	14	17
%	10.66	29.33	39.33	9.33	11.33
Distribution based on sex					
Masculine	6	23	36	8	12
Feminine	10	21	23	6	5

Our attention is drawn to 10.66% of students who choose the “zero” option, which is worrying because milk is an excellent source of animal proteins and mineral elements (especially calcium). Differences calculated based on school year are statistically insignificant ($p>0.05$, $f=4$, $\chi^2=1.338$), as are those calculated by sex ($p>0.05$, $f=4$, $\chi^2=0.778$). It is a problematic result for young people who practice sports and who need to adapt their nutrition to the needs of the body. Deficient milk intake can be offset by including dairy products in menus.

In the studied group, cheese is present in menus, especially once (40.00%) or 2-3 times per week (30.66%). There are 18.00% young people who choose the “zero” option, but also 11.32% who choose the “4-6 times” or “daily” options, both indicating adequate intake (Table 3).

Table 3. Weekly cheese intake

Weekly cheese intake	Zero	1 time	2-3 times	4-6 times	Daily
Distribution based on school year					
9 th grade	15	29	24	6	2
11 th grade	12	31	22	4	5
Total	27	60	46	10	7
%	18.00	40.00	30.66	6.66	4.66
Distribution based on sex					
Masculine	15	31	28	6	5
Feminine	12	29	18	4	2

Differences calculated based on school year are statistically insignificant ($p>0.05$, $f=4$, $\chi^2=2.029$), as are those based on sex ($p>0.05$, $f=4$, $\chi^2=1.619$). Thus we are witnessing similar eating habits among the pupils in the studied group.

Milk and cheese are included in the general “dairy” category, with nutritional value characterized by increased protein, lipid and mineral content. Balanced milk consumption is present in 20.66% of adolescents (4-7 times per week) while cheese only in 11.32% of pupils. The “zero” option is chosen in 10.66% of cases in terms of milk and 18.00% of cases in terms of cheese. The calculated differences are statistically significant ($p<0.05$, $f=4$, $\chi^2=11.712$) and draw attention to the preference of young people for milk to the detriment of cheese consumption.

Eggs are foods that are characterized by a special nutritional value with modest caloric levels. Their consumption is important to an athlete who needs high-quality products that do not lead to obesity. In the studied group dominant intake is 2-3 times (44.00%) or 1 time (25.33%) per week, which is totally inadequate (Table 4).

Table 4. Weekly eggs intake

Weekly eggs intake	Zero	1 time	2-3 times	4-6 times	Daily
Distribution based on school year					
9 th grade	11	19	30	9	7
11 th grade	4	19	36	9	6
Total	15	38	66	18	13
%	10.00	25.33	44.00	12.00	8.66
Distribution based on sex					
Masculine	5	23	38	12	7
Feminine	10	15	28	6	6

The balanced intake (4-7 times) is present in 20.66% of cases. Differences calculated based on school year are statistically insignificant ($p>0.05$, $f=4$, $\chi^2=3.842$), a fact that is difficult to understand for the 11th graders for whom physical effort levels are higher, but food intake is similar to those in the 9th grade. By gender the differences are statistically insignificant ($p>0.05$, $f=4$, $\chi^2=4.367$), an inadequate result because the physical exercise capacity of girls is lower and therefore the nutritional needs are inferior to those of boys.

Products of plant origin are bread and cereals, along with potatoes. The bread is present in menus mostly daily (46.66%), but there are also 7.33% adolescents who choose the “zero” option (Table 5).

Based on school year the calculated differences are statistically significant ($p < 0.05$, $f = 4$, $\chi^2 = 9.792$) and draw attention to the 9th grade students where the “zero” response is much less frequent.

Table 5. Weekly bread intake

Weekly bread intake	Zero	1 time	Distribution based on school year		
			2-3 times	4-6 times	Daily
9 th grade	2	12	15	9	38
11 th grade	9	5	22	6	32
Total	11	17	37	15	70
%	7.33	11.33	24.66	10.00	46.66
Distribution based on sex					
Masculine	6	5	20	11	43
Feminine	5	12	17	4	27

Based on sex the calculated differences are statistically insignificant ($p > 0.05$, $f = 4$, $\chi^2 = 7.506$), which reveals a similar intake of bread for girls and boys.

Cereals can replace bread or may be present in menus along with it. In the majority of cases (42.00%) pupils eat cereals once per week or 2-3 times per week (33.33%). We must not overlook the 12.00% students who choose the “zero” answer (Table 6).

Table 6. Weekly cereals intake

Weekly cereals intake	Zero	1 time	Distribution based on school year		
			2-3 times	4-6 times	Daily
9 th grade	9	28	29	6	4
11 th grade	9	35	21	4	5
Total	18	63	50	10	9
%	12.00	42.00	33.33	6.66	6.00
Distribution based on sex					
Masculine	12	29	29	8	7
Feminine	6	34	21	2	2

By school year, the differences are statistically insignificant ($p > 0.05$, $f = 4$, $\chi^2 = 2.544$) that being the same case when looking at the sex of the student ($p > 0.05$, $f = 4$, $\chi^2 = 7.462$), showing a strong anchoring in family traditions.

Daily bread consumption is present in 46.66% of adolescents while daily cereal intake is present in only 6.00% of cases. The calculated differences are statistically significant ($p < 0.0000$, $f = 4$, $\chi^2 = 78.180$) and underline the preference for bread.

Of the vegetables, we will insist on potato consumption, a product that grows abundantly in the fields in Moldova. Surprisingly, students mainly chose the “1time” option (37.33%) or “2-3 times” (38.00%) per week. There are 5.33% of students who choose the “zero” option, but also 6.66% who marked the “daily” answer (Table 7).

Table 7. Weekly potato intake

Weekly potato intake	Zero	1 time	Distribution based on school year		
			2-3 times	4-6 times	Daily
9 th grade	3	28	25	13	7
11 th grade	5	28	32	6	3
Total	8	56	57	19	10
%	5.33	37.33	38.00	12.66	6.66
Distribution based on sex					
Masculine	6	32	31	11	5
Feminine	2	24	26	8	5

Differences calculated by school year ($p > 0.05$, $f = 4$, $\chi^2 = 5.558$) and by gender ($p > 0.05$, $f = 4$, $\chi^2 = 1.472$) are statistically insignificant and show similar eating habits.

Discussion:

The study was carried out comparatively on school years and sex. These are students in the 9th grade (14-15 years) and in the 11th grade (17-18 years old). The nutritional needs are different depending on the age group so it is important to evaluate how the diet changes / does not change taking into account this element. The comparative study based on sex is significant because in the prepubertal and pubertal period there are changes in body composition between the two sexes. In boys the specific changes relate to muscle mass development whilst in girls they relate to the

development of adipose tissue. These differences are essential to those who practice performance sports and who have specific nutritional needs (Zugravu & Cilinca, 2009).

The first element in the study is the one related to breakfast. On the day the questionnaire was applied, 66.00% of positive responses appear. In a study carried out 5 years ago at the same high school, 77.38% positive responses appeared (Albu & Hodorca, 2014). It is an insufficient result for students who practice sports and go to school (where they will train) with energy reserves reduced after nighttime sleep. The insignificant differences based on school year and gender show a strong anchoring in the traditions of the students' families. The evaluation of morning meals in Alexandria adolescent girls highlights inadequate results, as they often chose the "rarely" response (63.6%), while only 10.2% of young women chose the "daily" response (Emara, Mehanna, Ashour, Koura & Shatat, 2018). An adolescent study in Austria found that teens ate breakfast in 52% of cases (Drenowatz, Greier & Klein, 2018).

Dairy consumption is essential because it provides increased intake of quality proteins and mineral elements (especially calcium) (Martin & Tarcea, 2015). Unfortunately, the studied group shows low consumption, which is a big problem. Milk is preferred to cheese. Once per week milk intake is seen in 29.33% of young people (32.30% for girls and 27.05% for boys) and when looking at cheese, once per week consumption is seen in 40.00% of cases (44.61% for girls and 36.47% for boys). In a study carried out on teenagers in Bucharest the consumption of milk "once per week" is present in 10.66% of cases for girls and 8.12% for boys and the consumption of cheese showed 9.97% for girls and 4.05% for boys (Milici & Neagu, 2014). In our study, the situation is far more serious, with nutrition education intervention required. Also, the insignificant differences calculated by school year and sex point to the existence of similar eating habits that are not positive for the young people who practice performance sports.

Balanced egg consumption (6-7 eggs per week) gives the body a supply of quality protein, lipids, vitamins and minerals (Zugravu & Cilinca, 2009). Unfortunately, in the studied group the intake is unbalanced, especially 2-3 times per week (44.00%). In another study carried out on teenagers in Iasi, the same dominant egg consumption of 2-3 times per week (42.61%) shows the existence of similar eating habits for Moldovan youth (Albu, Moraru & Hodorca, 2015).

Bread is present in menus mostly daily, bread consumption being dominant over that of cereals. The "once per day" answer is present in 16.00% of cases, 2 times per day in 32.66% of cases and 3 or more times per day 51.33% of cases. In Alexandria's teenagers, daily consumption is present in 23.3% of cases, 2 times per day in 40.2% of students and 3 or more times in 36.5% of young people (Emara, Mehanna, Ashour, Koura & Shatat, 2018). For the teens in the studied group the increased consumption of bread is a positive result because bread is rich in carbohydrates and calories, but it also provides increased protein intake (Martin & Tarcea, 2015). In a comparative study of adolescents in France, we are seeing a reduction in bread intake in recent years, while grain consumption has remained unchanged (Rovillé-Sausse & Glavce, 2011).

Particular attention should be paid to the consumption of vegetables (potatoes) because they are products that offer a modest nutritional and caloric intake. In a study carried out on teenagers in Poland, there is a positive correlation between intense physical activity, fruit / vegetable consumption and the sex of the student, which is a problem because fruit / vegetables do not provide the caloric intake needed to carry out intense physical activity (Zarychta, Chan, Kruk & Luszczynska, 2018).

Performance sports require the existence of a complex team. This team should contain pupils, parents, coaches and nutritionists (which are quite necessary according to the results of our study). The nutritionist must know the stages of development of the student's body and appropriately cover the particular nutritional needs of a sports student. Appropriate training of such a specialist is required because of the required in-depth knowledge of the growth / development of young people and the demands of the body through high-performance sports. The best solution would be to have a nutritionist in sports high schools and not just at the level of sports clubs (if they exist there).

Conclusions:

Not all students questioned eat breakfast, which is a concern when considering the need to provide the energetic support needed for intense physical activity.

Students in the studied group have large imbalances in the consumption of food products of animal and vegetable origin. The differences between school years and sexes are statistically insignificant, which highlights the strong anchoring in traditions of the students' families. It is an element that has negative effects on students' performance levels, because their needs are different depending on the age group and sex.

It is necessary to develop consistent nutritional education programs that favour the increase of sports performance levels and maintain the health status of the students.

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Physical Activity And Eating Habits For A Group Of Adolescents From Suceava

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Abstract

Physical activity and nutrition are external factors that play a major role in ensuring normal growth and development of children and young people. **Material and Method:** The study was carried out on a group of 166 teenagers in the 11th grade from three high schools in the city of Suceava. There are 50 young people from an Economic College, 51 students from a Technical College and 65 teenagers from a general high school. A questionnaire was given to these young people, with questions about their eating habits and the amount of time they spend on physical activity. **Results and discussion:** most of the pupils (60.84%) practice physical activities daily, between 15 and 60 minutes, but the differences between high schools and sexes are statistically significant for $p < 0.05$ ($f=4$, $\chi^2=9.587$) and $p < 0.0001$ ($f=2$, $\chi^2=26.677$). Dominant milk intake is once per week (28.91%) or 2-3 times per week (33.73%), which is totally inadequate. Differences calculated by high school are statistically significant for $p < 0.05$ ($f=6$, $\chi^2=13.033$). Eggs are consumed 2-3 times (39.75%) per week, with a statistically significant difference based on gender, for $p < 0.01$ ($f=3$, $\chi^2=10.029$). Potatoes are present in menus, especially 2-3 times per week (42.77%), and sweets 4-7 times (66.86%). **Conclusions:** The time allotted for physical activity varies by high school and gender. Nutrition is unbalanced, which raises many problems.

Keywords: physical activity; high school; nutrition.

Introduction

Physical activity and nutrition are external factors that contribute greatly to the normal growth and development of children and young people. Daily physical activity increases pulmonary ventilation, muscle mass and muscle tone, improves intestinal transit and improves reflexes (Urzeala, 2018).

Physical activity also contributes decisively to improving self-image, increasing professional efficiency and generating a balanced family behavior.

Issues related to improving self-image are important today, when identifying with the current beauty ideal. There are many situations in which the body aspect is balanced, but does not correspond to the social ideal, which can lead to depression, anxiety, social isolation, elements that are not beneficial to a young person (Abalasei & Trofin, 2016).

In the family, physical activity can be a factor of balance and collaboration between parents and children. Parents and children can choose to practice sports as a recreational activity or watch sports competitions. In a study of 368 teenagers in Tokyo and Kyoto and their parents, there were 102 mothers (out of 321 surveyed) and 38 dads (out of 123 included in the study) who practiced sports with children "often" or "always". Also, there are 171 mothers and 65 fathers who follow sports programs along with their children, often or always. In this way, the educational activity from school is associated with that in the family, which allows for increasing the interest of the child, and then of the future adult, for this type of relaxation method (Tanaka, Okuda, Tanaka, Inoue & Tanaka, 2018).

Physical activity and balanced nutrition represent the basic elements of ensuring that adequate body weight is maintained in children and young people. For an obese child or teenager, the restrictive diet is problematic because it can be associated with the appearance of serious imbalances. It is much easier to achieve a level of nutritional intake based on rational nutrition norms, associated with increased physical activity time (i.e. with the increase in energy consumption) (Jurikova & Prudilova, 2016). Achieving this goal involves a close collaboration between physical education teachers and medical staff.

For children and teens, observing the recommendations of rational nutrition rules is a very important element, but

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rather difficult to achieve in practice. There are a number of foods to eat because it is "cool" but also some products that are not consumed because young people do not like the taste (Baciu, 2011). In a study carried out in Turkey on the members of a fitness club, there are also some answers regarding the existence of foods that people do not like (meat - 13.2%, eggs - 9.5%, vegetables - 10%, fruits - 8.6%) (Demirici & Toptas Demirici, 2018).

Nutritionists will have to take this into account, especially when they want to change the eating habits of young people.

Objectives of the study: evaluating the daily physical activity of students; knowing the differences that arise / do not arise between the different schools in terms of the time allotted by students for sport; the assessment of the differences that appear / do not appear between boys and girls regarding the concern for physical activity; knowing the eating habits of the students; assessing the differences that appear / do not appear between the eating habits of pupils from different schools; studying the eating habits of boys and girls from the three schools.

Material and methods:

The research was carried out on a group of 166 pupils from three high schools in the city of Suceava. There are 50 young people (30.12%) from an Economic College, 51 teenagers (30.72%) from a Technical College and 65 (39.15%) from a National College. Young people are in the 11th grade and are between the ages of 16 and 18. The distribution based on sex is uneven, with 109 girls (65.66%) and 57 boys (34.33%) being questioned. A questionnaire was given to these young people, about their daily physical activity levels and weekly frequency food intake.

To the question "How much sport or other physical activities do you practice per day (in minutes)?" the possible responses are: Under 15 minutes; 15-60 minutes, Over 60 minutes.

Food habits were assessed from a weekly intake of food groups. To the question "How many times a week do you consume: milk, eggs, potatoes, sweets?" the response variants are: zero; 1 time; 2-3 times; 4-7 times. It has also been studied the correlation between daily physical activity and potato consumption.

The results were processed based on schools and the sex of the student, using the Pearson's chi-squared test.

Results:

The study is oriented in two main directions: that of daily physical activity and that of eating habits.

Daily physical activity contributes to maintaining the health of young people. In the studied group the dominant response is 15-60 minutes per day (60.84%) which is not encouraging. Our attention is drawn by the 23.49% of young people who practice sports less than 15 minutes per day, and the 15.66% of students who chose the "Over 60 minutes" answer (Table 1).

Table 1. Time allotted by students for daily physical activity

School	Under 15 min	15-60 min	Over 60 min	Total
Distribution based on school				
Economic College	8	35	7	50
Technical College	16	23	12	51
National College	15	43	7	65
Total	39	101	26	166
%	23.49	60.84	15.66	
Distribution based on sex				
Girls	32	71	6	109
Boys	7	30	20	57

The differences among schools are statistically significant ($p < 0.05$, $f = 4$, $\chi^2 = 9.587$) and draw attention to the students from the Economic College, whose frequency of responses for the "Under 15 minutes" answer is reduced (16.00%) and the students from the Technical College where the frequency of "over 60 minutes" answers is quite high (23.52%).

Differences based on sex are statistically significant ($p < 0.0001$, $f = 2$, $\chi^2 = 26.677$) and draw attention to girls who are less concerned about practicing sports. The response "Under 15 minutes" is present in 29.35% of cases for girls and in 12.28% of cases for boys. Educational programs should be geared to increasing girls' interest in systematically practicing sport.

The second aspect studied is that of assessing the eating habits of the questioned pupils. Specifically, we are talking about the consumption of animal products (milk and eggs) and vegetable products (potatoes and sweets).

Milk is present in students' menus especially 2-3 times per week (33.73%) or once per week (28.91%). The balanced intake (4-7 times) is present in only 17.46% of young people. We must not overlook the 19.87% of students

who choose the “Zero” answer, which is worrying (Table 2).

Differences calculated based on schools are statistically significant ($p < 0.05$, $f = 6$, $\chi^2 = 13.033$) and draw attention to students from the National College where milk intake of 4-7 times per week is present in 26.15% of cases. Differences calculated by gender are statistically insignificant ($p > 0.05$, $f = 3$, $\chi^2 = 4.809$) and show the existence of similar eating habits.

Table 2 - Weekly milk intake

School	Distribution based on school			
	Zero	Once	2-3 times	4-7 times
Economic College	11	11	20	8
Technical College	8	24	15	4
National College	14	13	21	17
Total	33	48	56	29
%	19.87	28.91	33.73	17.46
Distribution based on sex				
Girls	24	32	39	14
Boys	9	16	17	15

Adolescents can eat 6-7 eggs per week, but there are only 19.87% of “4-7 times” per week answers. Dominant intake is 2-3 times (39.75%) or once (27.71%) per week. Our attention is drawn by the 12.65% of young people who chose the “Zero” option, which is totally insufficient (Table 3).

Differences calculated based on schools are statistically insignificant ($p > 0.05$, $f = 6$, $\chi^2 = 5.718$) and are oriented towards a strong anchoring in the traditions of the students’ families. Differences calculated by sex are statistically significant ($p < 0.01$, $f = 3$, $\chi^2 = 10.029$) and draw attention to girls whose eggs intake of 4-7 times per week is only present in 12.84% of cases while boys have 26.31% of 4-7 times per week responses.

Table 3. Weekly eggs intake

School	Distribution based on school			
	Zero	Once	2-3 times	4-7 times
Economic College	9	13	19	9
Technical College	6	19	16	10
National College	6	14	31	14
Total	21	46	66	33
%	12.65	27.71	39.75	19.87
Distribution based on sex				
Girls	17	36	40	16
Boys	4	10	26	17

Potatoes are widely consumed in the area of Moldova and obviously in Suceava County. Dominant intake is 2-3 times (42.77%) or even 4-7 times (39.15%) per week (Table 4).

The differences based on schools are statistically insignificant ($p > 0.05$, $f = 6$, $\chi^2 = 1.685$), a normal result considering the fact that it is a staple food for the area of Moldova.

The results obtained by gender are statistically insignificant ($p > 0.05$, $f = 3$, $\chi^2 = 0.477$), a bit strange result for girls, because they have a moderate caloric value. Girls in the study group are not concerned with body weight control by eating foods that have a low caloric value (fewer than 90 kcal/100 g of food).

Table 4. Weekly potato intake

School	Distribution based on school			
	Zero	Once	2-3 times	4-7 times
Economic College	1	8	24	17
Technical College	1	8	19	23
National College	2	10	28	25
Total	4	26	71	65
%	2.40	15.66	42.77	39.15
Distribution based on sex				
Girls	3	18	45	43
Boys	1	8	26	22

We have also analyzed the relationship between daily physical activity and weekly potato intake. In most cases, students consume potatoes 2-3 times per week and exercise daily for 15-60 minutes (30.72%) (Table 5).

Table 5. Correlation between physical activity and daily potato intake

Intake	Zero	Once	2-3 times	4-7 times	Total
Under 15 min.	2	9	13	15	39
15-60 min.	1	14	51	35	101
Over 60 min.	1	3	7	15	26
Total	4	26	71	65	166

The calculated differences are statistically insignificant ($p > 0.05$, $f = 6$, $\chi^2 = 9.306$) and highlight the situation where young people practice sports for over 60 minutes per day but whose food intake (even potatoes) does not increase.

Sweets are consumed on a large scale by young people because of their specific taste. Dominant input is 4-7 times (66.86%), a response that is in concordance with rational food standards. Unfortunately, there are also 3.01% negative responses and 7.22% “Once” per week responses. These responses are alarming because the removal (or reduction) of sweets from the menu is associated with a decrease in energy intake required for good functioning of the nervous system (Table 6).

Table 6. Weekly sweets intake

School	Zero	Once	2-3 times	4-7 times
Distribution based on school				
Economic College	2	1	12	35
Technical College	0	2	11	38
National College	3	9	15	38
Total	5	12	38	111
%	3.01	7.22	22.89	66.86
Distribution based on sex				
Girls	2	6	23	78
Boys	3	6	15	33

Differences calculated by schools are statistically insignificant ($p > 0.05$, $f = 6$, $\chi^2 = 10.221$) as well as those calculated by sex ($p > 0.05$, $f = 3$, $\chi^2 = 4.331$).

Discussion:

We will insist on the two main directions pursued in this study, namely physical activity and eating habits.

Daily physical activity (over 60 minutes per day) is seen in only 15.66% of cases. In a study carried out in the Moldovan area, on pupils in the 7th and 8th grade, we can observe daily physical activity in 37.83% of cases (Albu & Albu, 2018). Practically, with age, there is a decrease in students' interest in physical activity. It is an element which must be known by the teachers, and appropriate educational intervention is required.

In the studied group there are statistically significant differences when considering schools, which show different levels of interest for practicing sports. There may also be a difference in family involvement in this regard. In a study of Swiss teenagers in which parents' participation in physical activity was also assessed, 45.7% of the parents attend physical activities a few times per week (Bringolf-Isler, Schindler, Kayser, Suggs & Probst-Hensch, 2018). It is an aspect that should also interest us because parents can become role models. Also, practicing the sport together increases the time spent by the parent with his / her child, which is very important.

Differences calculated by gender are statistically significant and point towards a reduced interest in girls for physical activity. In a study carried out in Chandigarh (India), on students from the 9th and 12th grades, we see a similar effect. Sport is often practiced during school hours by 27% boys and 17% girls. The study continues with the assessment of the type of physical activity preferred. We can see that girls are less interested in physical activities that involve intense physical effort. They are especially interested in walking, while boys are interested in running, collective games, cycling (Makkar & Man, 2017).

Balanced nutrition implies the consumption of animal products (milk, eggs) and vegetable products (potatoes, sweets).

Milk is absent from the menus of 19.87% of students, which is worrying because it is an excellent source of animal proteins, lipids, vitamins and mineral elements (especially calcium). We are also starting to wonder about this result and the possibility that milk may not be something that these young people like to consume. There are 22.01% negative responses from girls and 15.78% from boys, so the differences are statistically significant. In a study carried out on teenagers in Bucharest on the “rarely” / “never” option, 13.17% negative responses came from girls and 12.18% negative responses from boys, a result somewhat similar to both sexes (Milici & Neagu, 2014).

Eggs are present every day in menus in 19.87% of young people, a result that corresponds to rational nutrition norms. Eggs are missing from menus in 12.65% of cases, which raises many questions. Does the family not consume

eggs or do these young people not like them? - these are questions to be answered by specialists in the field. A similar situation occurs in Sudan adolescent studies where there are 28.1% of cases where eggs are consumed daily and 4.8% of cases where they are never consumed (Misaa, Somiya Gutbi & Siham, 2018).

Potatoes are present daily in the menus in 39.15% of cases, but 2.40% negative responses also appear. Negative responses may be related to the fact that they do not like potatoes or they are not consumed in the family. In a Uruguay adolescents study, the problem of the lack of consumption of vegetables again arises because pupils do not like the taste, color, texture or vegetables have never been consumed in the family (Raggio & Gambaro, 2018). The correlation between potato intake and physical activity reveals the existence of some statistically significant differences. Thusly there is no increase in calorie intake in a situation of increased calorie burn due to demanding physical activity.

Sweets are often consumed by the majority of students, a result considered normal - in French literature this is considered to be the "traditional childhood model" (Godeau, Arnaud and Navarro, 2008).

Conclusions:

Daily physical activity is not a basic element of students' daily program. Girls are even less interested in this issue, a worrying result because physical activity makes a major contribution to maintaining body weight at an optimum level.

The food habits of young people are often similar, which should be taken into account by nutritionists. There is a strong anchoring in tradition considering food in the area of Moldova. In this context, modifications to the daily menu can be made, but there is a need for a coherent intervention, not a random one (such as providing fruits to a population that already consumes them in sufficient quantities). There are some new elements that will need to be addressed in future research such as the correlation between physical activity of parents and the child or the issue of the existence of foods that are not consumed with pleasure by young people or their families.

Such studies are important because they make it possible to know the real situation on the ground and to guarantee the correct orientation of national educational programs.

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Sport Outcomes In Youth Development. A Meta-Analytic Approach

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Abstract

Our paper approach starts from the premise that youth experience many positive developmental outcomes through their sport involvement, although adolescence is a critical developmental period. In this paper, we intend to approach the effect of sports in adolescence. Starting from the two different theoretical positions about sport participation outcomes: positive effects of sports sustained by developmental theory, and negative views of sport participation sustained by zero-sum theory and conflict theory, we tried to analyse the results presented in the field literature. Our meta-analysis tries to give a better understanding of the impact of sports participation during youth on emotional well-being and other developmental outcomes. Among the positive results, we can consider a significantly higher self-esteem than the non-athletic counterparts and a decrease of their stress, significantly lower levels of delinquent behaviour, positive peer relationships, and leadership skills. As negative effects, we can list that sport takes up a large amount of participants' time that affects their school preparation, arrogance, feelings of superiority and invulnerability of elite athletes. Although there can be also negative sport effects, according to reviewed studies, there is a big number of positive outcomes that recommend teens sport activities for their contribution to youth general positive development.

Keywords: adolescents, sport, well-being.

Introduction

Adolescence is a critical developmental period, conventionally understood as the years between the onset of puberty and the establishment of social independence (Steinberg, 2014).

From a developmental perspective, the age of 14 years is considered a significant psychosocial benchmark (Curtis, 2015). This is the age, when an adolescent demonstrates the "ability" to maintain adult reasoning patterns (Petersen & Leffert, 1995). The National Research Council and Institute of Medicine (NRCIM, 2002) has outlined four main areas of youth development: physical, intellectual, psychological/emotional, and social.

Our paper approach starts from the premise that youth experience many positive experience, many positive developmental outcomes through their sport involvement.

Positive and negative outcomes of youth sport participation

Our literature findings cover a large range of positive and negative effects of adolescents' sport participation. Fejgin (1994) highlights different theoretical positions about sport participation outcomes: positive effects of sports are sustained by developmental theory and functionalist theory, while zero-sum theory and conflict theory both have negative views of sport participation.

Positive outcomes of youth sport

Fraser-Thomas et al. (2005) consider that youth sport programs actively work to assure positive outcomes through developmentally appropriate designs and supportive child–adult (parent/coach) relationships.

Physical development. The most obvious health benefits of physical activity (Health Canada, 2003) are considered cardiovascular fitness and weight control. Additional benefits are among skill development, improved muscular strength, muscular endurance, flexibility, and bone structure (Côté & Hay, 2002). Other findings highlight that adolescents involved in regular physical activity are less likely to smoke than adolescents not involved in regular physical activity (Aaron et al., 1995). More than that, physical activity habits developed during youth are associated with physical activity habits in adulthood (Baronowski et al., 1992; Robertson-Wilson et al., 2003).

Psychological/emotional development. Sport and physical activity offer teens opportunities to experience

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challenge, fun, and enjoyment, increase their self-esteem and decrease their stress (Long, 1985; Health Canada, 2003).

From developmental theory perspective, sports bring positive social norms and values, develop social skills, teamwork and self-discipline (Videon, 2002). Another benefit involving sport participation is a positive relationship with emotional and behavioral well-being (Donaldson & Ronan, 2006).

Gilman (2001) underlined that participation in structured extracurricular activities, like sports, was associated with higher life satisfaction among youth, and that the more structured activities teens participated in, the higher their life satisfaction. Fraser-Thomas & Côté (2004) conducted a research involving grade five students, randomly selected from an elementary school in a mid-size Canadian city. Youth recorded all the activities for two days, and rated their enjoyment for these activities from 'no fun', 'some fun', to 'lots of fun.' Results show that those involved in sport activities experienced significantly more happiness or subjective well-being in their day-to-day living.

The literature in the area of sport, exercise, and emotional well-being has focused primarily on the relationship between exercise, sports participation and anxiety, depression, self-esteem, and psychosocial stress (Biddle, 1992). Research confirm an association between youth sports participation and various positive mental health related outcomes (Frederick & Eccles, 2005; Miller, Melnick, Barnes, Farrell & Sabo, 2005; Darling, Caldwell & Smith, 2005; Smith, Ntoumanis & Duda, 2007; Kiluk, Weden & Culotta, 2009; Smith, Ntoumanis, Duda & Vansteenkiste, 2011).

Sarah J. Donaldson Kevin R. Ronan (2006) study examined the relationship between children's sports participation and emotional well-being including self-reported emotional and behavioral problems and multifunctional aspects of self-concept. Among other findings, they report that increased levels of sports participation had a positive relationship with aspects of emotional and behavioral well-being, particularly self-concepts; youth who participated more in sports, whether formal or leisure time, would report fewer problem behaviors and increased perceptions of competencies as compared with youth with lower levels of sports participation. The conclusion that raised from this study, that young adolescents may not necessarily have to be competent at sport in order to gain psychological benefits from participation, has a big theoretical and practical importance.

There are also studies reflecting that athletic involvement was related to lower depression (Frederick & Eccles, 2005). According to them symptoms of depression are often lessened due to the influences of behavioral activation, social activities, and increasing one's sense of identity/purpose. Kiluk et al.'s (2009) discovered a connection between anxiety and athletic involvement.

Several researchers have linked youth athletic involvement with an increase in resiliency (Bartko & Eccles, 2003; Fredricks & Eccles, 2008). Bartko and Eccles (2003) looked at data in a longitudinal study of 16-17-year-old adolescents and found that sports involved youth were more psychologically resilient than their non-athletic counterparts. Fredricks and Eccles (2008) examined 8th to 11th graders and discovered that youth who participated in sports during 8th grade saw an increase in psychological resiliency over time. Other findings reveal that participating in sports seems to increase resiliency by giving young athletes multiple opportunities to achieve success and receive public recognition (Fredricks & Eccles, 2008). Involvement in sports also provides athletes with a context to overcome opposition, obstacles, and even failure on a consistent basis. Several studies have highlighted the link between youth sports participation and higher self-esteem (Barber et al., 2001; Fredricks & Eccles, 2008; McHale et al., 2005).

Social development. Sport experiences foster citizenship, social success, positive peer relationships, and leadership skills (Elley & Kirk, 2002; Wright & Côté, 2003). Youth sport and physical activity participation has been positively correlated with adult career achievement (Larson & Verma, 1999) and negatively correlated with school dropout and delinquent behaviour (Eccles & Barber, 1999).

Côté (2002) suggests that sport provides an arena for the development of social skills such as cooperation, assertion, responsibility, empathy, and self-control. Jeziorski (1994) found that participants in sports earned better grades, behaved better in the classroom, had fewer behavior problems outside the classroom, dropped out less frequently, and attended school on a more regular basis with fewer unexcused absences as compared to nonparticipants.

Youth involved in sport often demonstrate discipline and commitment (Shogan, 1999); preliminary evidence suggests that these traits carry over into other domains of life such as school and community (Carpenter, 2001).

While many researchers (e.g. Gilman, 2001) have made the case that youths' involvement in structured activities such as sports, music, and the arts fosters positive psychological and emotional development, Larson (2000) proposes that initiative, a key component to youths' positive social development, can also be developed through these structured activities. He also argues that youth need to take charge of their lives through the development of initiative. Stronger ties to athletic involvement leads to stronger connection with school, community, and educational objectives (Barber et al., 2001; Guest & Schneider, 2003). Positive effect of participation in interscholastic sports on academic outcomes could be explained by the ability for youth sports involvement to promote students' development and social ties among other students, parents, and school officials (Broh, 2002).

Donaldson & Ronan (2006) showed that the more formal sports participation and the longer the participation, the lower the scores on Externalizing Problems, Social Problems, Aggression Problems, and Delinquency Problems. Stronger evidence was found in their study that showed a consistent relationship between an increased number of sports and amount of time spent in them reduced externalizing and societal behavior problems. Those who engaged in more formal sports and for a greater length of time reported significantly lower levels of delinquent behavior, aggression, and peer related problems.

Intellectual development. Youths' involvement in physical activity has been positively correlated with academic performance in numerous studies (Dwyer et al., 2001; California Department of Education, 2002).

Participation in high school sport has been positively linked to school grades, school attendance, choice for demanding courses, time spent on homework, educational aspirations, college attendance, and low dropout rates was underlined during and after high school, and college attendance (Jeziorski, 1994; Whitley, 1999). According to Colcombe & Kramer (2003) levels of fitness in children are positively related with greater levels of attention and working memory. In the same direction points out the study of Reisner, White, Russel, & Birmingham (2004) which reveals that sports promote high attendance and increase mental acuity, improving mathematics achievements. Athletic involvement improves executive functioning in children aged 4-12 years old (Diamond & Lee, 2011). Relationship between sports participation and later learning potential was stressed also by (Lipscomb (2007).

Other recent studies highlighted also significant correlation between youth sports participation and higher rates of academic achievement (Barber, Eccles & Stone, 2001; Broh, 2002; Darling, Caldwell & Smith, 2005; Fredricks & Eccles, 2006; Davidiuk, 2016).

Negative outcomes of youth sport participation

Zero-sum theory consider that sports takes up a large amount of participants' time that affects their school preparation. In addition to this idea, conflict theorists identify other negative aspects of sport participation like: minority and economic disadvantaged teens are consuming more of their time to sport, neglecting their school tasks, in an attempt to achieve material success and to overcome their social condition (Coakley, 2015).

Physical outcomes. As physical negative effects can be considered sport related injuries and eating disorders (Steiner et al., 2000; Anshel, 2004). It seems that higher ranked team (2nd vs. 17th in the world) had done more training, but rated their overall health significantly lower ranked team (Beamer & Côte, 2003). There are many of sport injuries caused by training volume (Hollander et al., 1995), by risk-taking (Steiner et al., 2000), and the nature of the sport (Fraser et al., 2005).

Emotional/psychological development. Youth often feel excessive pressure to win, perceive themselves as having poor abilities, feel unattached to their teams, and feel vulnerable in the presence of team mates (Wankel & Mummery, 1990). Such experiences led youth to experience low-confidence and low self-esteem. Another negative outcome is athletic burnout (Smith, 1986; Coakley, 1992). Smith (1986:37) defined burnout as a "psychological, emotional, and at times physical withdrawal from a formerly pursued and enjoyed activity"; Coakley (1992) consider that social organizations of high performance sport, rather than individual stress-based problems are responsible for athlete burnout.

Social development. There were revealed a number of negative social outcomes such as: acts of violence and aggression in youth sport settings (Colburn, 1986); acts of violence considered acceptable and legitimate within the sport environment (Gardner and Janelle, 2002); poor sportsmanship linked to youth sport involvement, while morality reasoning within the sports context has been found to decrease with age (Bredemeier, 1995; Lemyre et al., 2002).

For a better understanding of the extent of positive and negative outcomes we considered a meta-analytic table to reveal the types and the extent of sports effects in youth's life (Table 1.).

Table 1. Sport outcomes in youth development

META-ANALYSIS		
Authors	Positive	Types of outcomes
Long, 1985	Sport and physical activity offer youth opportunities to experience challenge, fun, and enjoyment, while increasing their self-esteem and decreasing their stress.	Psychological/emotional development
Mize, 1991	Physical activity and sport can play an important role in fostering cognitive development in youth.	Intellectual development.
Biddle, 1992	Positive relationship between exercise, sports participation and anxiety, depression, self-esteem, and more recently on psychosocial stress.	Psychological/emotional development
Jeziorski, 1994	Participants in sports earned better grades, and had fewer behavior problems.	Social & Intellectual development.

META-ANALYSIS		
Authors	Positive	Types of outcomes
Aaron et al., 1995	Physical activity habits developed during youth are associated with physical activity habits in adulthood.	Physical development
Larson & Verma, 1999	Youth sport and physical activity participation has been negatively correlated with school dropout and delinquent behavior. Youth sport and physical activity participation has been positively correlated with adult career achievement.	Social & Intellectual development.
Shogan, 1999	Youth involved in sport often demonstrate discipline and commitment.	Social development
Whitley , 1999	Participation in high school sport has been positively linked to school grades, school attendance, choice for demanding courses, time spent on homework, educational aspirations during and after high school, and college attendance.	Intellectual development.
Larson, 2000	Initiative, a key component to youths' positive social development, can also be developed through these structured activities.	Social development
Barber et al., 2001	Stronger ties to athletic involvement leads to stronger connection with school, community, and educational objectives. There is a link between youth sports participation and higher self-esteem.	Psychological/emotional, Social & Intellectual development.
Carpenter, 2001	Youth involved in sport often demonstrate discipline and commitment and these traits carry over into other domains of life such as school and community.	Social & Intellectual development.
Diamond & Lee, 2011	Athletic involvement improves executive functioning in children aged 4-12 years old	Intellectual development.
Dwyer et al., 2001	Youths' involvement in physical activity has been positively correlated with academic performance.	Intellectual development.
Gilman, 2001	Youths' involvement in sports fosters positive psychological and emotional development.	Psychological/emotional development
California Department of Education, 2002	Youths' involvement in physical activity has been positively correlated with academic performance.	Intellectual development.
Broh, 2002	Positive effect of participation in sports on academic outcomes could be explained by the ability for youth sports involvement to promote students' development and social ties among other students, parents, and school officials.	Social & Intellectual development.
Côté, 2002	Sport provides an arena for the development of social skills such as cooperation, assertion, responsibility, empathy, and self-control.	Social development
Bartko & Eccles, 2003	They linked youth athletic involvement with an increase in resiliency.	Psychological/emotional development
Colcombe & Kramer, 2003	Levels of fitness in children to be positively related with greater levels of attention and working memory	Psychological/emotional development. Intellectual development.
Guest & Schneider, 2003	Stronger ties to athletic involvement leads to stronger connection with school, community, and educational objectives.	Social & Intellectual development.
Health Canada, 2003	Active youth are less likely to develop diseases later in life including heart disease, obesity, diabetes, osteoporosis, stroke, depression, and cancer. Sport offer youth opportunities to experience challenge, fun, and enjoyment, while increasing their self-esteem and decreasing their stress.	Physical & Psychological/emotional development
Robertson-Wilson et al., 2003	Physical activity habits developed during youth are associated with physical activity habits in adulthood.	Physical development
Wright & Côté, 2003	Sport experiences foster citizenship, social success, positive peer relationships, and leadership skills.	Social development
Fraser-Thomas & Côté , 2004	Youth involved in sports experienced significantly more happiness or subjective well-being in their day-to-day living.	Psychological/emotional development

META-ANALYSIS		
Authors	Positive	Types of outcomes
Park, 2004	Given that subjective well-being or happiness has long been considered a central component to optimal development and a good life (Park, 2004), these findings highlight the additional role of sport involvement in youths' positive development.	Psychological/emotional development
Reisner, White, Russel & Birmingham, 2004	Sports promote high attendance and "provide physical exercise needed for subsequent mental acuity"	Intellectual development.
Darling, Caldwell & Smith, 2005	Positive association between youth sports participation and various positive mental health related outcomes. Significant correlation between youth sports participation and higher rates of academic achievement.	Psychological/emotional & Intellectual development.
Frederick & Eccles, 2005	Athletic involvement was related to lower depression.	Psychological/emotional development
McHale et al., 2005	Positive association between youth sports participation and higher self-esteem.	Psychological/emotional development
Miller, Melnick, Barnes, Farrell & Sabo, 2005	Positive association between youth sports participation and various positive mental health related outcomes	Psychological/emotional development
Donaldson & Ronan, 2006	Positive association between sports participation and young adolescents' emotional well-being.	Psychological/emotional & Social development
Fredricks & Eccles, 2006	Significant correlation between youth sports participation and higher rates of academic achievement. Athletic involvements linked with an increase in resiliency.	Intellectual & Psychological/emotional development
Lipscomb, 2007	Positive relationship between sports participation and later earning potential.	Intellectual development.
Smith, Ntoumanis & Duda, 2007	Positive association between youth sports participation and various positive mental health related outcomes.	Psychological/emotional development
Kiluk, Weden & Culotta, 2009	Positive association between youth sports participation and various positive mental health related outcomes.	Psychological/emotional development
Authors	Negative	Types of outcomes
Coulburn, 1986	Acts of violence and aggression is common in youth sport settings.	Social development
Wankel & Mummery, 1990	Youth often feel excessive pressure to win, perceive themselves as having poor abilities, feel unattached to their teams, and feel vulnerable in the presence of team mates.	Psychological/emotional development
Coakley, 1992	Highlight the problem of athletic burnout. Social organizations of high performance sport, rather than individual stress-based problems are responsible for athlete burnout.	Psychological/emotional development
Bredemeier, 1995	Poor sportsmanship is linked to youth sport involvement, while morality reasoning within the sports context has been found to decrease with age.	Social development
Hollander et al., 1995	Many sport injuries are caused by training volume.	Physical development
Steiner et al., 2000	Sport related injuries and eating disorders.	Physical development
Gardner and Janelle, 2002	Acts of violence were considered acceptable and legitimate within the sport environment.	Social development
Lemyre et al., 2002	Poor sportsmanship is linked to youth sport involvement, while morality reasoning within the sports context has been found to decrease with age.	Social development
Anshel, 2004	Sport related injuries and eating disorders.	Physical development
Fraser et al., 2005	Many sport injuries are caused by the nature of the sport.	Physical development

Conclusions

Nowadays, there is a growing concern about youth problems related to their behavior (delinquency, school drop-out, drug related problems etc.) -combined with less parental supervision- and their physical and emotional health.

According to all reviewed studies, although there can be also negative sport outcomes, there is a big number of positive outcomes that recommend teens sport activities for their contribution to youth general positive development.

Although there can be also negative sport effects, according to reviewed studies, there is a big number of positive outcomes, involving psychological, intellectual, social and emotional aspects, that recommend teens sport activities for their contribution to youth general positive development.

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The Teaching Necessity Of Sports Law At The Profile Faculties

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Abstract

The study of sports law is a relatively new field among the branches of law. However, the sports law is developing continuously in conditions, where very large sums are invested periodically in sports activities, so that sport can be considered a business at present. Sports law has also took on major importance and to those involved in sports management and entrepreneurship.

Sport is a social activity that has conduct rules and a minimum of institutional framework. Reflection of the essence and features of the sport phenomenon, the purpose and tasks of physical education and sport, its value and its limits, content, principles, rules, methods and forms of sports competitions, legal liability and sports legal relationships, sports contracts and accidents, imposition and taxes in the field of physical culture and sport, legal regulation of sponsorship and advertisement in sport, legal aspects regarding fight against and violence in sport, citizens' rights in the field of physical culture and sport, fight against doping in sport, sports jurisdiction may constitute problems which must be addressed and studied in the context of sports law.

Moreover, any deviation from the requirement of normative acts governing the field of physical culture may constitute a favoured framework to illicit conduct off the "sport ground", and by the knowledge of some treaties, conventions, agreements, ordinary laws, codes, by a careful analysis thorough selection and training in sport, specialists in the field can address these topics through the prism of knowledge and respect of the subjective rights and legitimate interest of athletes. If these rights or an interest legally guaranteed violates these rights, the injuries could be causing to the athletes, and so coaches, sports managers, organizers of sports competitions may be in the presence of civil offense giving rise to civil liability under tort law. At the same time, it is only possible to defend and guarantee the subjective rights of participants in sports activities - athletes, physical education teachers, coaches, supporters shall be possible only in so far as to the extent that the legal rules contained in the objective law can be invoked. All these arguments create prerequisites for teaching under the study programmes of the profile faculties of the discipline "Sports Law".

Keywords: sport law, sports faculties, legal training.

Introduction

In a constantly changing society, the knowledge and understanding of legal concepts, their efficient application in sports activities and practice is a necessity in conditions in which the modern methodology stimulates the student's flexibility and sociability as a leading actor in the teaching and learning process. Starting from the modern perspective of education, the need arises for students to take responsibility for their own learning, developing metacognitive and self - evaluated skills (lifelong learning competences) throughout the entire educational path (Albulescu M., 2001). Thus, the focus is on alternative learning modalities, on introducing into the instructive-educational process of ideas, principles and facts that can be used and understood in a significant context. The specifics of teaching the "Sports Law" discipline to the students from the faculties of physical education and sport, implies the application of the concrete learning situations and case studies from the legal practice / sports activities, fact which allows them to acquire new knowledge in the field, and learning to become more effective. The source of learning represents these legal individual cases, to a greater extent than the teacher, since their solving encompasses learning by participating in analysis, dialogue and interpretation (Pânisoara I.O., 2004). The solution of various legal individual cases (as well as practical activities) within the theoretical course "Sports Law" should therefore be as an active method of great heuristic and applicative value. Thus, it can be used either as a support of inductive knowledge or as the basis of a deductive knowledge (Budevici Puiu L., 2016).

The purpose of the research is to establish the necessity to teach the "Sports Law" discipline at the profile faculties, updating, applying and capitalizing the innovative didactic methodology for an efficient learning of legal concepts and for the formation of legislative competences for students, future specialists in the field of reference.

The objectives of the research:

- the theoretical-practical establishment of the necessity to teach the study discipline "Sports Law" at the faculties of physical education and sport;

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- the identification of the effective methodology of teaching the respective discipline from the point of view of the beneficiaries of educational services;
- the elaboration of experimental research methodology;
- the formulation of conclusions and recommendations.

The methodology of the research. In order to achieve the proposed objectives we used the following methods: analysis and synthesis of the specialized literature on the approached research problem, generalization and systematization of the data; graphic and experimental methods.

The theoretical-practical establishment of the necessity of teaching the “Sports Law” discipline at the faculties of physical education and sport was achieved by elaborating and applying a sociological questionnaire (Budevici Puiu L., 2005). The questionnaire represents a list of questions about the studied problem, arranged in a specific order by which it was followed to obtain information about the same issue from a larger number of subjects (Table 1).

The sample of investigated subjects (managers of sports organizations of different hierarchical levels) encompassed 57 respondents, 23 (superior managers) respectively, 15 (middle managers) and 19 (managers of private sports clubs). The age structure of the respondents categories indicates a majority of older managers - about 60% (being over 50), 40% of managers (are aged up 40 years old) - (Figure 1). Analyzing the accumulated data from the responses of the respondent categories following the application of the set of questions, we identified the need to teach the “Sports Law” discipline to the faculties of physical education and sport. Thus, managers gave positive answers in over 70% and negative answers constituted a percentage of 30%, specifying that by the accumulation and application of legal knowledge in the professional activity carried out by specialists in the field, surely will be ensured an adequate understanding of contracts relating to sports law, in particular those relating to the transfer of players, exploitation of rights to play, sports betting and financing. Also, by studying this subject, the administrative, labor law or exclusivity, sponsorship and advertising contracts can be debated, because they are the most often encountered in sports jurisprudence.

Tabel 1. Structuring the questions with reference to the necessity of teaching the “Sports Law” discipline at the faculties of physical education and sport after Sarivan L., Gavrilă R., Stoicescu D, 2009 modified by us

Why is it necessary to study the „Sports Law” discipline?	<p style="text-align: center;">Why is this study discipline valuable to students?</p> <p style="text-align: center;">What is the connection between their personal and professional experience?</p> <p style="text-align: center;">What will students be able to do in a short time by learning and applying the legislative knowledge in the field?</p> <p style="text-align: center;">What will allow students to make or understand in the future?</p> <p style="text-align: center;">What reflection occasions give this discipline for students?</p> <p style="text-align: center;">How will they prepare the students, to find out more and better understand this discipline?</p>
What will students do?	<p style="text-align: center;">What knowledge do the selected contents include within this study discipline?</p> <p style="text-align: center;">Which of them are related to the benchmarks set?</p> <p style="text-align: center;">Which of these are necessary and sufficient for the intended purpose?</p> <p style="text-align: center;">What knowledge will be explored by students?</p> <p style="text-align: center;">Which aspects of the reference discipline invite students to the continuation of investigations or to another type of action, after teaching it?</p>
How will they do?	<p style="text-align: center;">How can reference discipline be used to develop communication, analysis and investigation skills? But to form at the studying finality of legislative competences?</p> <p style="text-align: center;">How can the curriculum content of the discipline be chosen or arranged, to stimulate a wide range of correct answers to various issues within the sports activities?</p>
How much has it done?	<p style="text-align: center;">What are some of the important issues to interpret or that can invite students to express their own point of view?</p> <p style="text-align: center;">What proof will there be that students have learned something from the curricular content of the discipline?</p> <p style="text-align: center;">What processes of thinking, learning strategies and group processes do we expect to observe in students?</p> <p style="text-align: center;">What can students do, to demonstrate that they have achieved the objectives of studying this discipline through individual activities?</p> <p style="text-align: center;">For which types of evaluation can opt, for what purpose and when?</p> <p style="text-align: center;">How will we proceed, so that the evaluation will be valid?</p> <p style="text-align: center;">How will we use the data, to ensure the success in dynamic of each student?</p>

At the same time, by teaching this discipline, it will be possible to realize an incursion in: the law of the companies having as object of activity, the provision of sports services, the studying of subjects of liability in the sports law (organizers, participants, etc.), as well as forms of liability which can be employed in this matter (civil, administrative, disciplinary), in the conditions of the specific of sports competitions. The introduction of this discipline in the curriculum associated with study program from the profile faculties will generate that in the curriculum content to be addressed other issues such as: anti-doping, sport governance, and last but not least, the regulation of international

sports litigation, arbitration and proceedings before international arbitration courts, as well as relevant arbitral jurisprudence. Students can also carry out analyzes and syntheses of recent jurisprudence on conflicts of jurisdiction, by reference to the competence of the Court of Justice of the European Union in disputes concerning sports activity.

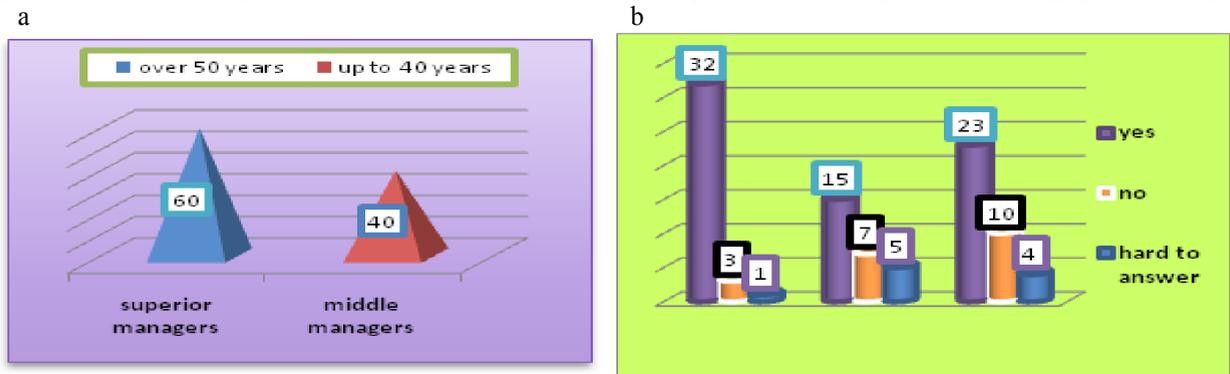


Fig. 1. (a) Age structure of the respondent categories; (b) Graphical reflection of the answers with regard to the necessity to teach the “Sports Law” discipline at the faculties of physical education and sport.

Regarding the answers to the questions reflected in Table 1 with reference to “How can the reference discipline be used to develop communication, analysis and investigation skills? But to form at the study finality of legislative competences ? ”

Teaching science through investigation represents an important step in the education science. The publication “Education Science now: A renewed pedagogy for the future of Europe”, (report-Rocard, 2007), stipulates the importance of investigation into the teaching of disciplines as science (after similar actions in the USA in 1996 NST, 1996 EDC Center for Education Science, 2007).

Thus, learning by investigation has been officially promoted in many countries like that kind of pedagogy needed to improve the way to learn of science (Bybee et al, 2008, Savas et al 2003, Hounsell & McCune, 2002.). In this context, the teaching of the “Sports Law” discipline, as a scientific-didactic discipline (focused on its own principles, rules and concepts) can ensure integrity by clearly establishing of some convergent relations between scientific knowledge, skills, attitudes and behaviors as structures of competencies and of the values that have the basis within it, distinctly.

Legislative competencies will be formed at the students from the profile faculties, at the finality of the studying of the reference discipline, and the legal individual cases exemplified in the training process, supplemented by problems, carefully selected for solution by the academic staff and students, have a significant role, imposed by the mechanism of knowledge itself and the formative needs of the curriculum. Students' communication skills can be formed and developed through the study of normative acts regulating the field of physical education and sport, through their application and interpretation, because within the individual activities by solving the various legal individual cases, students are in the situation to exemplify the applicable law in force for the cause given with training of critical thinking in this respect.

With regard to the identification of the effective teaching and learning methodology of the respective discipline from the point of view of the beneficiaries of educational services we can mention that the succession of activities that constitute the training process becomes very suggestive for the elaboration of an efficient model that will be in line with the itself natural way of the knowledge and to be accorded also with students' cognitive possibilities. Thus, starting from the analysis of the specialized literature (Crețu, D, 2001, Vințanu, N., 2001, Diaconu, M., Jinga, I, 2004), we propose as fundamental way of organizing the training process in the “Sports Law” discipline, the teaching on the basis of individual cases from the legal practice with the application of the legislation in force and on problem situations, establishing several stages teaching and learning activities reflected in Figure 2.

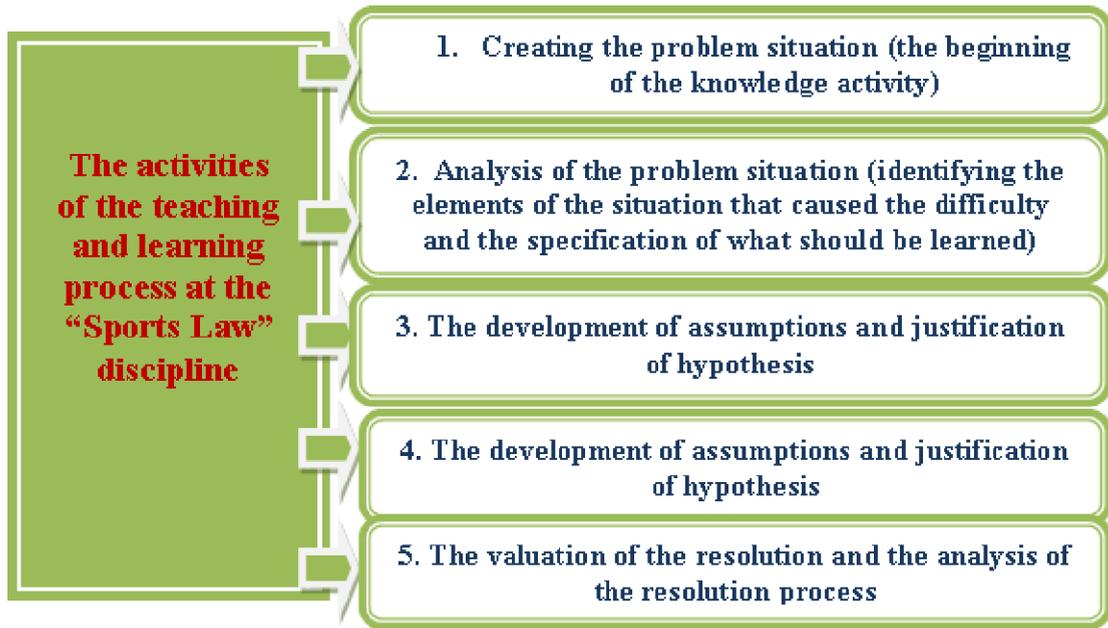


Fig. 2. The activities of teaching and learning process at the “Sports Law” discipline

In the first stage, students can find themselves in various situations that require some explanation, which generates the desire to receive further clarification about the problem situation that may arise and in the elaboration activity and encounters certain difficulties when inconsistencies arise between the theoretical explanations and the concrete facts (legal individual cases) or when certain knowledge is found to be incomplete.

The second stage (activity) involves understanding the problem, when students can still ask for clarification to arrive at its final formulation (to solving the legal individual case or the created problem situation). The problem can be formulated by the teacher and reformulated by the students or even formulated by the latter.

The third activity of the teaching and learning process of the reference discipline involves students through their attempts to give anticipated answers, under directing of the teacher, that they confronted with the legal facts, to the normative acts that can be applied, and of the logic interpretation in this case. Thus, students come to know new facts, which could help them in the justification of assumptions or can lead to their denial. This stage of the teaching and learning process is very important, because it advances knowledge until the solution is found.

The demonstration activity of the hypothesis and problem solving stops at the formulated hypothesis that proves to be the most well-founded and, on its basis, solves the problem, finding the unknown searched.

The last activity involves the specification of the found solution, verifying it with new facts, consolidating of the contents of the new constituted notion.

According to Weinert (2001), competences can be defined as “those cognitive aptitude and skills that can be learned, to solve certain problems, as well as the motivational, volitional and social availabilities and capacities associated with them, in order to can capitalize issues in variable situations successfully and in a responsible way.” Starting from this definition and trying to identify the principles of learning planning centered on competence at the discipline we are monitoring in research, we can make the following specifications:

- learning must be guided individually by motivation;
- by learning to take into account current developments of the followed professional field, namely of physical education and sport;
- the applied methods in the learning process of the “Sports Law” discipline should be diverse: forms of learning and working in cooperation and collaboration (education through projects, education based on problem-solving (legal individual cases), open education based on cooperation.

The teaching and learning model of “Sports Law” discipline monitors the process of knowledge from the point of view of the teacher's activity (teaching) and from the point of view of the students' activity (learning). In Figure 4 we schematically show this process in terms of finding and evaluating learning outcomes based on competencies at the reference discipline.

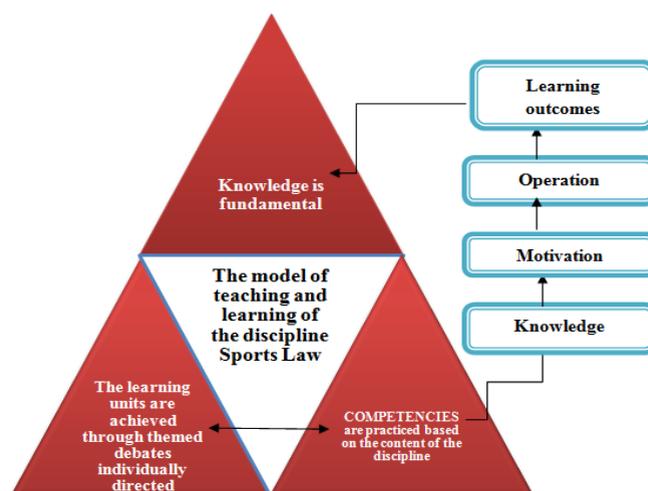


Fig. 3. The teaching and learning model of the Sports Law discipline

Conclusions

We can mention that through the teaching of the Sports Law discipline at the profile faculties, legislative competences will be formed for the future specialists in the field from the perspective of the three dimensions: *affective* (students will learn to motivate themselves for learning, because the knowledge of normative acts is necessary; students will learn different learning strategies and understand the need to change in professional development for a successful career; students will adapt to the new learning environment adopted in the instructive-educational process); *cognitive* (identifying some new learning opportunities, knowledge and use of rules and regulating principles specific to sports activities, application and interpretation of normative acts, verification of found information according to the normative acts in force, use of some mental instruments, of logic and critical thinking); *metacognitive* (problem solving, legal individual cases, performance of some monitoring and interpretation tasks, accuracy in established results, trust and communication correctly addressed in different legal situations).

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Study On The Type Of Provided Services And The Topographic Peculiarities Of The Fitness Centers From Iasi

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Abstract

In a city such as Iasi, with an increased dynamics of the population and a high percentage of young people, even if it is seasonal, it is necessary to have a specific infrastructure that dealt with the requirements of the population regarding the fitness services. The aim of the study is to perform an analysis of the topographic distribution of the fitness centers, of the types of provided services, as well as a statistics of the applied prices. The research is justified by the fairly high number of fitness centers, the great variety of the provided services (from centers that provide only one service – aerobics – to multifunctional centers (including recovery programs), from “family owned business” centers to international brand centers. Based on the obtained results, we have noticed some criteria regarding the necessary conditions for equipping and locating some new fitness centers, as well as a correlation between the provided services and the options of the clients. The research also emphasizes the existence of some fitness centers integrated within public institutions that offered services to its members, but also outside people so as to ensure an efficient management

Keywords: Iasi, management, fitness, activities, services.

Introduction

”Iasi is among the oldest and one of the most important settlements in the country where an authentic Romanian life has always strongly pulsated. As the capital of Moldova, the city has offered to the national patrimony invaluable material and spiritual values and filled the history of our country with glorious pages recorded lastingly in the people’s consciousness. Iasi is located near the Eastern border of Romania and it is a main development pole of the Eastern part of the European Union. It is one of the most powerful academic centers in the country with more than 55.000 students each year, enrolled in 5 state universities and 2 private universities. On July 1th, 2015, the Municipality of Iasi had 359.843 inhabitants, out of which: 171.811 men and 188.032 – women” (<http://www.primaria-iasi.ro/portal-iasi/pmi/meniu-pmi/52/despre-iasi>).

In order to meet the requirements of a continuously growing population and an increased flow of young people, the number of fitness centers from the city of Iasi has doubled over the last 10 years. At the same time with the increase of the number of locations, we also witness the coming on the market of some important brands, some huge centers, as well as the diversification of the provided services. (Chirazi, 2017). Due to the fact that the number of centers has multiplied over a very short period of time, their managers confront themselves with a fierce competition that forces them to look for marketing solutions that could attract the money of the consumers (Petrea, 2017). First of all, the manager must start from a big scale image of the consumers’ (clients’) equation following this definition: satisfaction is the ratio between benefits and costs. In other words, if the client is satisfied, it increases the probability to repeatedly buy a service which supposes that the benefits should be as high as possible and the costs as low as possible. The next step is to attract future clients by announcing the grand opening of the club/center through advertising. Now is the time for the manager to act so as to inform the consumer about the products that might meet his requirements. The presentation of the alternatives offered by the club represents an invitation addressed to the consumer to join the club as a member.

In choosing the location and the provided services, the manager must take into account several criteria regarding the specific character of the activity, the expectations of the possible clients, as well as other peculiarities.

The factors that condition and influence the physical activity in a fitness center are presented and interpreted below.

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Gender: it is known that there is a higher rate of men practicing all kinds of sports as compared to women, especially those intended for bodybuilding, which means that a source of income could be providing and attracting male clients for specialized training programs.

Age: the vast majority of older people do not practice a physical activity due to several affections that they suffer from, but this is generally wrong because many affections occur precisely due to the lack of physical activity in the life of those people. The type of performed physical activity changes at the same time with getting older. This example shows to the manager of a sports complex that he must expect a permanent dynamics of the types of services requested by the same person.

Social standing: sometimes, coerced by the social standing, some people are not available from this point of view. Some sports are expensive and even enrolling to a fitness club supposes paying a subscription fee. Moreover, practising any kind of physical activity requires some type of equipment and if the social standing of the respective person does not allow him to buy it, obviously that person becomes discouraged.

Economic condition of the city: sometimes the economic condition of the country or the city does not allow personal development so that there are very few places where a person can practice some type of sports. Thus, the majority of people are not sufficiently motivated in this respect and the managers are forced to apply a pricing policy depending on the economic potential of the area.

Educational system: also related to the economic condition of the country is the manner in which the educational system imposes the practising of the physical activity through the curriculum and the pupils are forced to exercise. As the pupils are more stimulated to practice physical exercise during the school years, the chances are they will continue to practice sports under different forms depending on what is suitable to each of them. Nevertheless, this is one the final purposes of the school physical education, which is “forming the abilities to practice independently physical exercise” (Cârstea, 2000).

Tradition and culture of the country: sports evolves permanently and constantly, usually reflecting the dominant values of the culture through rules, structure, creativity and tolerance of violence (Millman, 1999). This is a crucial aspect because promoting a certain sport in certain countries can increase the percentage of the people that practice physical effort, they being practically forced by tradition. Traditions can affect the orientation and participation to a certain type of physical activity. Culture can forbid women to practice certain sports in public or together with men. Thus, now-a-days, we witness the birth of some exclusive gender-based centers.

Education received from the family: when there are individuals in a family that practice certain sports, people are raised differently, according to other principles. Children living in families that promote a healthy life style are much more encouraged to follow it. „It is said that the cradle of sports traditions is the family, but no one acts much in the sense of making the parents acknowledge the need for physical exercise” (Epuran, 1990).

Entourage: regardless of the education received from the family, a person can change due to the people around him. When a close person practices a certain sport or a certain type of physical activity, the person in question will be thus motivated to practice as well that type of physical activity. Thus, some fitness centers promote a marketing strategy offering discounts to the clients that bring new customers or even occasionally allow loyal clients to be accompanied by other people that do not have a paid subscription.

Mass-media: by promoting some sports activities through radio, television or internet, people feel thus encouraged and guided to try certain activities. Sports is also known from the games broadcasted on TV or commented on the radio, thus representing a means of entertainment. When the sportsmen that practice a certain sport bring a lot of prestige through their won medals, it becomes even more advertised, thus more promoted.

Distance to the fitness center: if the fitness center is near home or the workplace/school/faculty, the person will be thus motivated to practise a physical activity. This is one of the main reasons why most of the fitness centers are located in major urban areas or near institutions and schools.

Disability: although people with disabilities are marginalized not necessarily by the people around them but by their condition itself, they are always encouraged to do something for themselves. They should attend those events organized especially for them. The fitness centers can also develop special programs, either for recovery or for people with special needs.

Environment and climate: this condition refers to the fact that the succession of seasons and holidays decisively influence the number of subscribers to the fitness centers. Therefore, an efficient management supposes scheduling the holidays of the trainers or the renovation of the location and the repairing of the equipment and installations.

In general, the daily concerns of a socially active adult can be divided theoretically and proportionally into: time for professional activities, time for passive rest and the so-called spare time. During the spare time, people have different concerns that can be divided into necessity, pleasure and time wasted without explanation. Therefore, the sports activities, such as fitness, performance sports, extreme sports, etc. fall under the category of hobbies and they

compete against cultural interests or pleasures, easy physical labour, practiced individually, together with the family or in groups with social affinities” (Paunescu et al, 2010).

Thus, the managers of the existent fitness centers or the future projects must think about new services, original activities or complex programs and, last but not least, a timetable as flexible as possible for the clients.

Another argument to support the need to develop fitness centers are the numerous studies that emphasize the low level of the physical condition among the population. (Stoian, 2017).

Methods and methodology

The study is based on a field documentation, through direct observation and interview and is focused on the following elements:

- location of the center;
- services provided for the center;
- type of equipment;
- prices;
- timetable;
- parking spaces;

This study is based on the following hypotheses:

- most of the fitness centers are located near the stations of the means of transportation,
- free parking spaces attract more clients,
- the high number of centers in an area leads to competition among them,
- the location of the centers near high schools, faculties, office buildings, commercial centers and complexes, restaurants and supermarkets.

Results

Following the performed study, we have identified a number of 43 fitness centers that develop their activity in the city of Iasi. In addition to them, there are also 4 centers intended only for electrical muscle stimulation, but we have included them in this category as well because they have the same goals and the efficiency of these procedures is also based on physical exercise. There are also five centers (gyms) administered by the most important universities of Iasi.

The centers have been divided into four categories (fig. 1)

- only with equipment (offering the possibility to strengthen the muscles with the help of the equipment) popularly called “fitness centers”, represented by the colour green;
- without equipment, only offer different forms of aerobics (without any equipment), that we are going to call aerobics centers, represented by the colour yellow;
- mixed (complexes that offer a wide range of services, including the above mentioned ones), represented by the color red;
- electrical muscle stimulation centers, represented by the colour pink.

From the point of view of the territorial location, we can notice (fig . 1) an increased density of complex centers and aerobics centers in the central area of the city. The centers that only offer exercises using the equipment are more isolated, more of the kind of neighbourhood centers or that belong to some educational institutions.

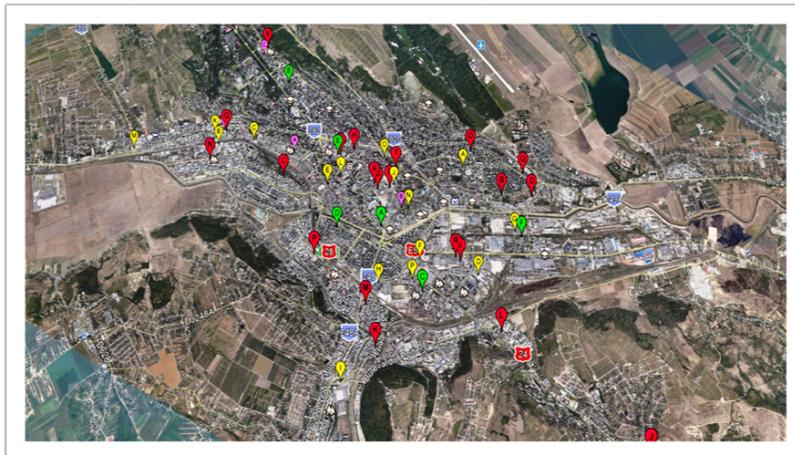


Fig. 1 Repartition territorial all centre from Iași

Also from the perspective of the territorial allocation, respectively the territorial distribution, we can notice (fig. 2) that the most increased density of the fitness centers is found in the central area of the city, where there are many commercial places and institutions. We have also included the sports facilities belonging to the academic institutions that are put at the disposal of the wide public.

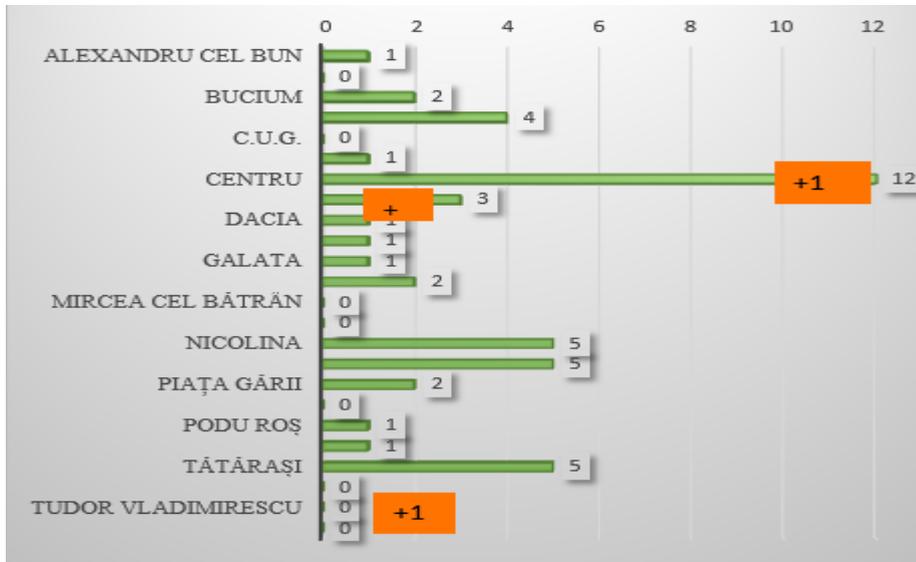


Figure 2. Distribution of the centers on areas and neighbourhoods

Although about 28% of the total number of centers are found in the central part of the city, during the last year, another one was opened which means that the investors believe that there are still potential buyers of the provided services. At the same time, we notice (fig.2 that there are neighbourhoods where there is not even one center, which is to be expected in neighbourhoods consisting mostly of individual households (private homes) such as the neighbourhood of Sararie, Moara de Vant. There are also neighbourhoods that are considered urban agglomerations (many blocks of flats) where there is no center (Mircea cel Batran).

We have noticed from the analysis of the type of services provided for the fitness centers (fig.3) that most of them offer complex services (49%), followed by those that offer only aerobics. This last type of gyms points out the fact that there is a category of clients, consisting especially of women that prefer this kind of centers, smaller, traditional, based on the quality of the offered services.

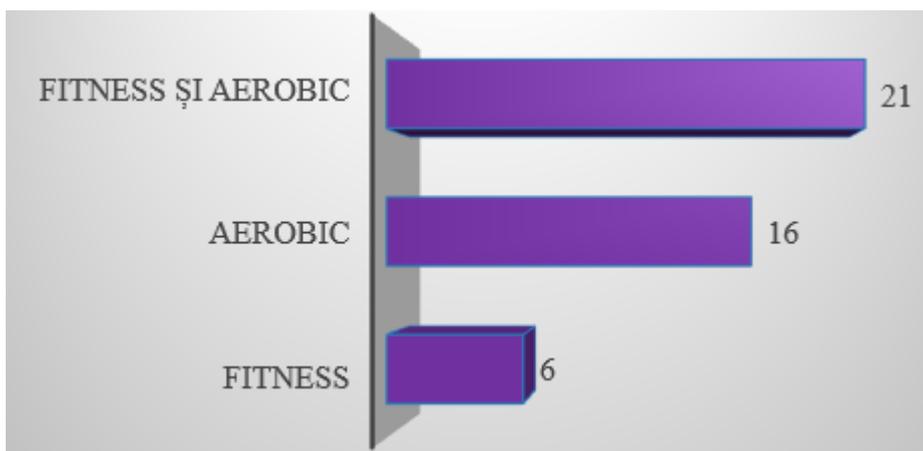


Figure 3. Distribution of the centers according to the type of provided services

Regarding the subscription fees (fig. 4.), most of the centers have prices ranging between 100-200 lei per month for the access to the center three times a week. The price that a client is willing to pay for a subscription illustrates the standard of living of the locality. Following a comparison between the prices applied by well-known brands, we can say that the cost of a subscription in the city of Iasi is low.

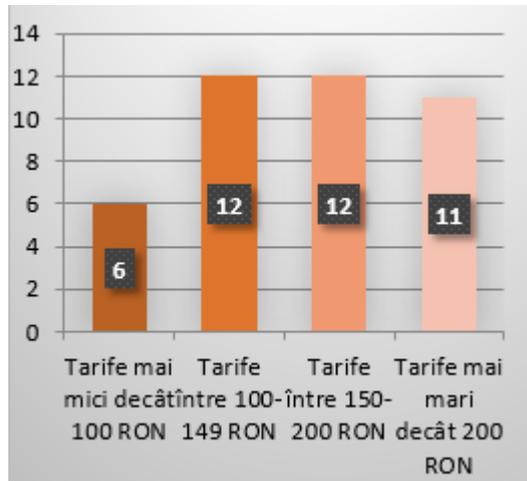


Figure 4. Distribution of the fitness and aerobics centers according to prices

Regarding the services provided for the fitness centers from the city of Iasi (fig. 5), we can notice that there is a fairly wide range, from those that offer only aerobics and fitness (48%) to those that offer therapy services (halotherapy, kinesiotherapy, physiotherapy) or special regime services such as climbing, boxing, martial arts).



Figure 5. Services offered by the fitness centers from Iasi

Another aspect that results from the study is the fact that even if the centers are mainly fitness centers, they also provide recovery programs (kinesiotherapy, physiotherapy) which means that there is a permanent trend to diversify the offers, that new places are especially built for this purpose and at the same time, the fact that the population has become more and more aware and responsible concerning the state of health. Another aspect taken into account by the study is the existence of private or public parking places around fitness centers. We have tried to emphasize the fact that the investors are permanently concerned with locating the centers near parking lots or even designing them

as part of the initial plan. It results from the research that more than half (53%) of the centers are not located near or do not have parking spaces which proves that the location of the centers in the areas of urban agglomeration is based on the fact that the population lives in the near-by areas and it can travel without a car to the center.

Conclusions

In general, any fitness center should include certain specific service packages. Some centers have more facilities, others less, but the most important thing is the clientele that the center wishes to attract. There are centers that offer service packages for young people (students, pupils), others offer services intended only for women. According to the world famous bodybuilding champion, Arnold Schwarzenegger „the first thing to take into account when looking for a gym to work out is the type of equipment it has” (Schwarzenegger & Dobbins, 1989). This is valid as long as the future potential client has a minimum knowledge regarding what he wants and what he is focused on.

The big fitness centers are located downtown and they have parking lots in their vicinity.

The pricing policy relies on a fairly fierce competition, the equipment within the centers, as well as the range of provided services. Nevertheless, the prices are low as compared to the standard of living of the city.

The present research has emphasized the complete lack of programs for disabled people, pregnant women or elderly people on this specialized market from the city of Iasi.

The doubling of the number of fitness centers on the level of the city of Iasi provided that the demographic rate of the country is decreasing, the physical activities performed outdoors (running, cycling, sports games) have become more popular which proves that the population, especially the young people, has become interested in its own body and implicitly health. The geographic location of the city on the level of the country and the continent and the climate conditions during the last period of time, as well as the lack of specific infrastructure for outdoor activities (cycling routes around the city, cycling tracks through the city, marked running trails, very few sports facilities) leads to the possibility of opening new centers, as well as maintaining a constant number of clients.

We mention that the study only focuses on the centers (closed spaces) that offer indoor activities. In Iasi, there are several centers that offer different types of physical activities (lawn tennis, football, football tennis, only some types of martial arts, etc.) that on their turn have their share of clients.

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Use of Tai Chi Forms to Increase ROM in Athletes

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Abstract

Asymmetrical sports, such as fencing, tend to develop an agonistic – antagonistic imbalance at muscular level, on the dominant lateral of the body, while at the same time a difference of tone between the right side and the left body side. This lack of balance represents a factor of joint mobility limitation. The importance of complete range of motion (ROM) has been proven essential in elite sports, and its limitation may influence the results negatively.

Numerous studies have shown the benefits of Tai Chi practice for general population, with effects ranging from improving balance, to influencing bone density.

The purpose of this study is to point out whether Tai Chi improves the mobility of asymmetrical sports practitioners.

The subjects of this study were 22 fencers, members of the Municipal Sports Club Iași (C.S.M. Iași), aged between 14 and 18, with more than three years of competitive activity. Out of the 22 subjects of this study 12 were female and 10 male, as age 6 athletes were 14 years old, 7 – 15 years old, 5 – 16 years old, one 17 years old and 3 -18 years old, and 20 were right handed while only 2 were left handed.

Materials and method: The subjects were tested initially and after seven months of practice, with sessions three times a week. The duration of each session was 20-30 minutes, at the beginning or at the end of fencing practice. The "fingertips-to-floor" test and goniometry were used to assess joint mobility range, and the initial and final results were subsequently compared.

Conclusions: Results indicate a positive evolution of spine mobility for both extension and side bend, 12 out of 22 subjects, and for the "fingertips-to-floor" test, 11 out of 22 subjects. These findings suggest that Tai Chi forms increase global mobility, mostly at spine level, and they feature a limited improvement of joint mobility on the limb used in the practice of asymmetrical sports.

Keywords: mobility; flexibility; fencing, Tai Chi, ROM;

Introduction

Asymmetrical sports tend to develop an agonistic – antagonistic imbalance at muscular level, on the dominant lateral of the body, while at the same time a difference of tone between the right side and the left body side. This muscular imbalance represents a factor of joint mobility limitation. The importance of complete ROM has been proven essential in performance sports, and its limitation may influence the results negatively (Rynkiewicz, et al., 2013).

A study conducted in 2011 with the purpose of assessing postural asymmetry and global mobility in female volleyball practitioners concluded that a detailed appraisal of posture and muscular imbalance by a physical therapist, as well as personalized compensating exercises and a stretching system may be recommended to all elite athletes, not only to volleyball players (Vařeková et al, 2011).

Tai Chi is a form of martial art, practiced mainly in oriental cultures. In the last 300 years, this approach to movement has been used as a form of exercise, practiced by millions of people of various ages; the dominant category is represented by Chinese seniors. Tai Chi dates to the period of the Yellow Emperor (Huang Di), who reigned over a confederation of tribal clans in northern China around the year 2700 BC. This form of martial art comprises a series of easy, cursive, slow movements, which fortify and relax the body and the mind (Wayne, Kaptchuk, 2008). There are various Tai Chi schools, but all of them share similar characteristics, such as attention, structural alignment and flexibility (Wayne, 2012). New forms of Tai Chi have evolved, including brief protocols for the elderly. Some forms, such as Taoist Tai Chi, focus specifically on health status and its improvement.

A research published in 2011 in the American Journal of Health Promotion – titled “A Comprehensive Review of Health Benefits of Qigong and Tai Chi” with the purpose of analyzing the studies conducted on this topic – has underlined the benefits of practicing this type of exercising on human health. Data for the period 1993 – 2007 were

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analyzed, which led to 77 studies meeting the criteria. These 77 studies and other papers meeting the same criteria were grouped into 9 categories: cardio-pulmonary effects (19 studies), quality of life (17 studies), physical function (16 studies), bone density (4 studies), immune function (6 studies), psychological symptoms (27 studies), self-efficacy (ADLs) (8 studies), balance improvement (23 studies), results reported by patients (13 studies) (Jahnke et al., 2010).

As Tai Chi became ever more popular, patients may ask the physical therapist or the physician whether they may benefit from this practice. A paper published in 2016 in Canada had the objective of summarizing the evidence regarding the therapeutic benefits of Tai Chi, so that clinicians may provide evidence-based recommendations to their patients. Starting from the idea that in the past 45 years, more than 500 studies and 120 systematic reviews were published regarding the health benefits brought by Tai Chi practice, the authors concluded that evidence abounds concerning health and fitness effects. The systematic analyses on Tai Chi for specific conditions indicate an excellent proof of benefits for preventing falls, osteoarthritis, Parkinson's disease, rehabilitation of chronic pulmonary obstructive pathologies and improvement of cognitive capacities in the elderly. There is positive evidence for fighting against depression, cardiac pathologies, stroke and dementia. Certain data support the benefit for improving the quality of life for patients with cancer, fibromyalgia, hypertension and osteoporosis. Current evidence does not indicate a direct benefit for diabetes, rheumatoid arthritis or chronic heart failure. The systematic analyses of general health and fitness benefits prove the excellent benefit for improving balance and aerobic capacity for persons with poor health status. There is reliable evidence for increasing resistance at the level of lower limbs. There is accurate evidence for increased wellness and improved sleep. There was no study suggesting that Tai Chi would decrease the quality of life (Huston, McFarlane, 2016).

Taking into account that the population group of elite athletes has not been approached by specialists in the field in association with this form of exercising, the purpose of this study is to point out whether Tai Chi improves the mobility of asymmetrical sports practitioners.

Materials and method

The study was conducted in the fencing hall of the Municipal Sports Club Iași (CSM), on a period of 7 months, with sessions three times a week, each session lasting 20 – 30 minutes at the beginning or at the end of fencing practice.

The sample of subjects included 22 athletes, fencing practitioners, aged between 14 and 18, with more than three years of competitive activity. Out of the 22 subjects of this study 12 were female and 10 male, as age 6 athletes were 14 years old, 7 – 15 years old, 5 – 16 years old, one 17 years old and 3 -18 years old, and 20 were right handed while only 2 were left handed.

If at the beginning of the Tai Chi session, the athletes had not completed their warm-up, for 5 – 10 minutes, stretching and body warm-up exercises were executed.

The Tai Chi elements used in this study were the 18 forms of the Chuan school (Wolf, Coogler, Xu, 1997).

Joint mobility was assessed actively, on segments, using goniometry, and globally by using the "fingertips-to-floor" test.

Results were presented as tables, while graphic representations were conducted using Excel 2013.

Results and discussions

Table 1 features the group of subjects and the results of assessing the "fingertips-to-floor" test, of global spine mobility test appraised by measuring the distance between the floor and the medius tip, after flexing the spine while keeping knees in full extension. The distance between the medius and the floor will be noted as (+) the number of centimetres, and if spine mobility allows the subject to lower the fingers more than the heel level, we will place the subject on an elevated surface. We will measure the distance from the sole to the floor, and we will subtract from it the distance between the floor and the medius tip. The result will be the number of centimetres left, noted as (-). (Tab 1.) These results are represented graphically in Figure 1 and Figure 2.

Table. 1 Sample of subjects and the results of the fingertips to floor test

No.	Surname and given name	Age	Sex	Initial testing	Final testing
1	A. M.	16 years old	F	15 cm	8 cm
2	C. C.I.	15 years old	F	0 cm	0 cm
3	C. L.E.	14 years old	F	-4 cm	-4 cm
4	C. M.A.	14 years old	F	0 cm	0 cm
5	F. D.E.	15 years old	F	2 cm	2 cm
6	L. A.	18 years old	F	-14 cm	-14 cm

No.	Surname and given name	Age	Sex	Initial testing	Final testing
7	L. B.	16 years old	F	-2 cm	-2 cm
8	M. M.	16 years old	F	2 cm	2 cm
9	R. I.	14 years old	F	-4 cm	-2 cm
10	S. D.S.	14 years old	F	5.5 cm	5.5 cm
11	T. C.	14 years old	F	0 cm	-3 cm
12	V. S.R.	18 years old	F	-1 cm	-2 cm
13	A. A.	15 years old	M	29 cm	25 cm
14	A.M. A.	15 years old	M	6.5 cm	5 cm
15	B. D.	15 years old	M	-1 cm	-1 cm
16	C. S.	18 years old	M	4 cm	2 cm
17	C. V.	15 years old	M	-2 cm	-6 cm
18	D. V.	15 years old	M	5 cm	0 cm
19	L. Z.	16 years old	M	-4 cm	-5 cm
20	M. C.	16 years old	M	6 cm	0 cm
21	P. S.	14 years old	M	3 cm	1 cm
22	V. A.	17 years old	M	-2 cm	-3 cm

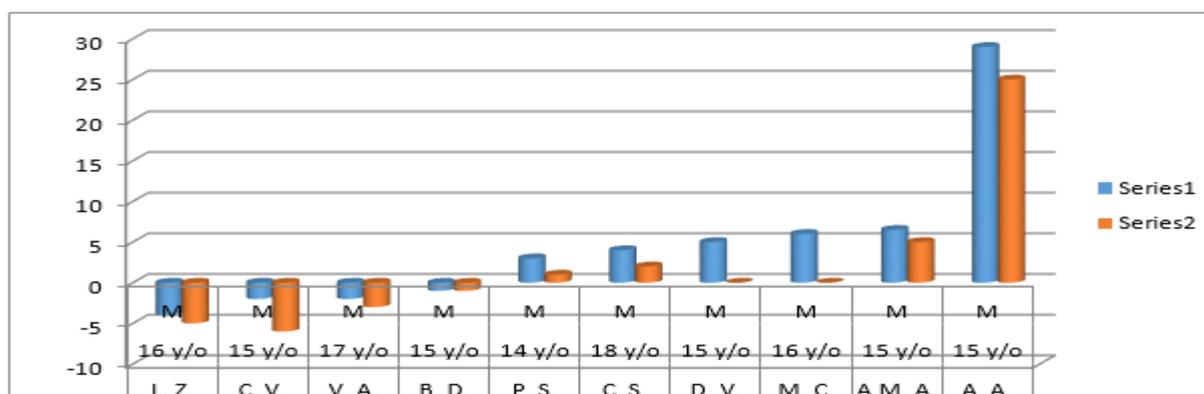


Fig. 1. Graphic representation of results for the "fingertips-to-floor" test for male subjects, measured in centimetres (series 1 – initial evaluation, series – 2 final evaluation)

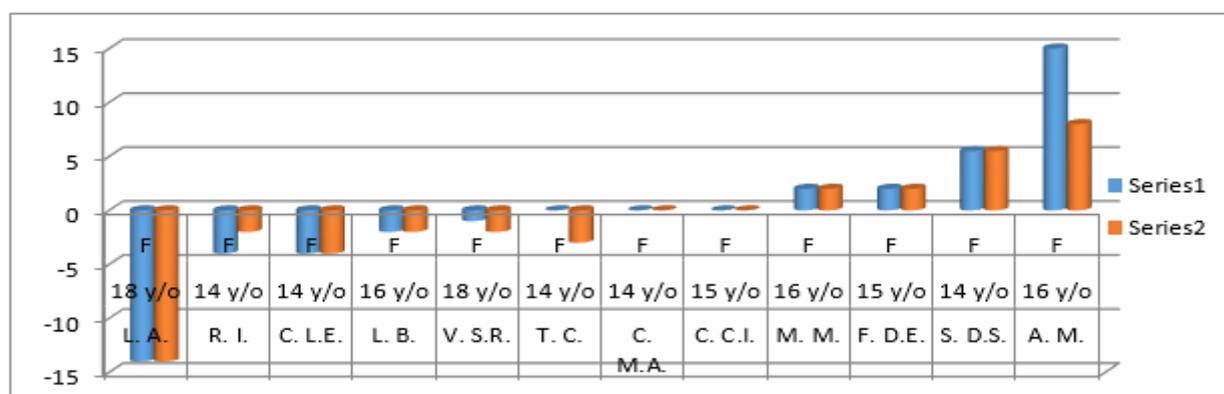


Fig. 2 Graphic representation of results for the "fingertips-to-floor" test for female subjects, measured in centimetres (series 1 – initial evaluation, series – 2 final evaluation)

The aforementioned Graphs and Tables show that in 4.5% of the cases, no improvements were noted. For 40.9% of the subjects, the results in centimetres were identical, while in 54.54% of the subjects, a modification of the "fingertips-to-floor" test was pointed out – this modification had various values: 7 cm (1 case), 6 cm (1 case), 5 cm (1

case), 4 cm (2 cases), 3 cm (1 case), 2 cm (2 cases), 1,5 cm (1 case), 1 cm (1 case). For us, such findings are encouraging, given the age and the variety of improved values (from 7 cm to 1 cm).

It is worth highlighting that our study included 10 boys and 12 girls. The interesting fact is that boys obtained in 9 cases (90%) increases of the "fingertips-to-floor" test, while only 3 female athletes showed such improvement (25%) – 66.67% maintained the same values of the test, only one cases featuring lower values than the initial ones. These aspects may be correlated with intrinsic motivation. Whereas there were no value progresses, all subjects reported an improvement in perceived flexibility and mobility.

Joint assessment was actively evaluated using the goniometre. We will feature only the joints and movements which showed an increase in joint range, relevant for this research.

The reference values for joint mobility assessment were taken over from Balint T. et al. (2007), while the subjects displayed from the initial evaluation a joint mobility ranging within these limits or even higher (Balint, 2007).

Spine extension recorded increased goniometric values in 11 of the subjects, of whom 7 females and 4 males (Table 2 and Figure 3). The other subjects had displayed a normal joint range from the initial evaluation, which was constant throughout the research, reason for which they were not included in the graphs.

Table. 2. Spine extension

Surname and given name	Initial testing	Final testing
C. L.E.	15°	25°
C. V.	20°	25°
L. Z.	20°	25°
C. C.I.	22°	25°
T. C.	25°	30°
P. S.	25°	30°
V. S.R.	25°	35°
L. A.	30°	35°
C. M.A.	30°	35°
R. I.	35°	40°
A. A.	40°	45°

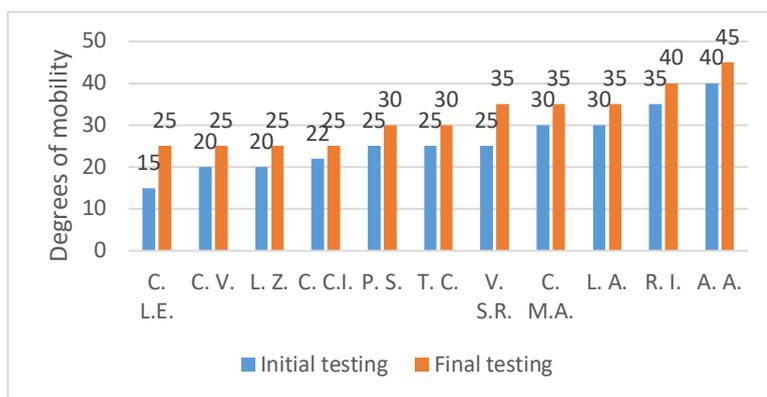


Fig. 3 Spine extension – graphic representation

Left side bending improved in 54.5% of the subjects (Table 3 and Figure 4).

Table. 3 Left side bending of the spine

Surname and given name	Initial testing	Final testing
C. S.	20°	35°
L. A.	40°	45°
L. Z.	20°	25°
S. D.S.	30°	35°
C. C.I.	25°	30°
M. M.	35°	40°
B. D.	25°	35°
M. C.	30°	35°
V. A.	30°	35°
C. M.A.	35°	40°
F. D.E.	40°	45°
A. A.	25°	30°

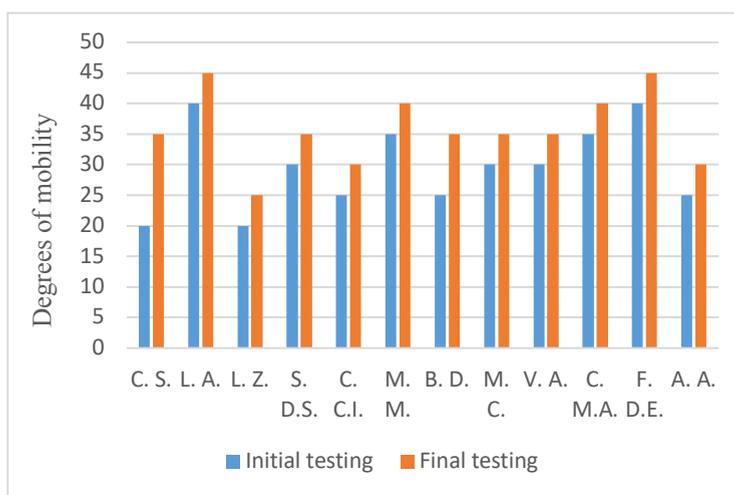


Fig. 4 Left side bending of the spine – graphic representation

Right side bending of the spine has not recorded important value increases, manifested in complete ROM from the initial evaluation in most subjects.

Another element highlighted by joint assessment is the misbalance between the dominant and the non-dominant side, as it occurs during adduction at the level of the coxofemoral joint. Table 4 features the subjects with different values between symmetrical points of reference and the mobility variation between them.

Table. 4 Right and left lower limb adduction – goniometric values

Surname and given name	Reference value[8]	Right lower limb		Left lower limb	
		Initial testing	Final testing	Initial testing	Final testing
L. B.	30°	30°	30°	25°	35°
C. V.	30°	30°	35°	25°	40°
T. C.	30°	30°	30	25°	25°
R. I.	30°	30°	30°	30°	35°
L. A.	30°	30°	35°	25°	30°
L. Z.	30°	30°	30°	30°	40°
S. D.S.	30°	35°	35	30°	35°
A. A.	30°	30°	30°	30°	35°
M. M.	30°	30°	35°	30°	35°
B. D.	30°	35°	40°	35°	40°
M. C.	30°	30°	30°	30°	45°
V. A.	30°	25°	30°	25°	30°

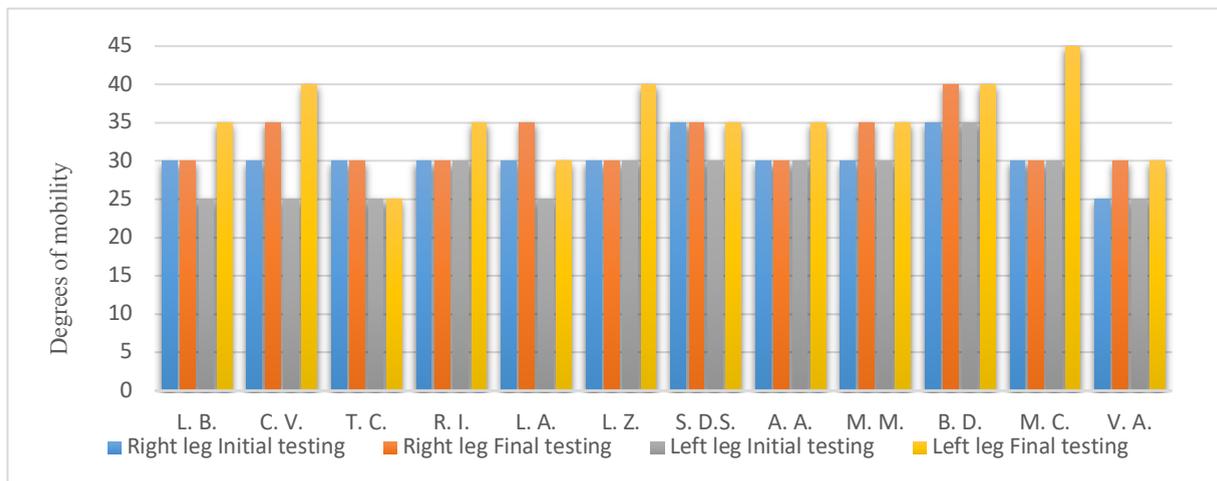


Fig. 5 Right and left lower limb adduction – graphic representation

Upon analysing the joint assessment for the upper limb, no important difference was noted between the initial and the final values, reason for which it may be concluded that the subjects – after practicing the forms of Tai Chi for seven months – feature a limited improvement of joint mobility in this segment.

Conclusions

After practicing the 18 forms of Tai Chi Chuan for seven months, results indicate a positive evolution of spine mobility, especially extension and side bend, in 12 out of 22 subjects, while in 11 out of 22 subjects, the values of "fingertips-to-floor" test improved. These findings suggest that Tai Chi forms increase global mobility, mostly in the spine, and they feature a limited improvement of joint mobility on the limb used in the practice of asymmetrical sports. If such exercises had been introduced much earlier during the practices, the results would have been even better – this is one of the topics proposed for future studies that we intend to conduct.

This study suggests that the benefits of Tai Chi practice are not limited to general or geriatric population, but they may also extend to elite athletes. The measured elements are limited to mobility-related aspects, but the subjects described multiple benefits following the seven months of activity. Hence, we believe that elements such as the assessment of respiratory system parameters or of stress level and the general mental state – all of them playing a vital role in high performance sports – are potential research topics for a better insight into these issues.

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The effect of the specific training on lower limbs specific repetition speed, in elite athletes of Qwan Ki Do martial art

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Abstract

The purpose of the current research is to highlight the effects of physical training, conducted in the pre-season and season periods, on the specific repetition speed of the lower limbs, in the martial art of Qwan Ki Do. We have started from the assumption that by using a judicious planning and proper acting systems, we can improve significantly the specific repetition speed of the lower limbs in Qwan Ki Do. The experiment took place throughout a period of around eight weeks, and it included 16 athletes (5 female athletes and 11 male athletes), components of the national Romanian team, who trained in that period for participating in the European Championship. The significant progresses recorded ($p < 0.05$) in most tests support the efficiency of the physical training program used regarding the manifestation of the speed of repetition, thus creating the premise of improving the efficiency of athletes during competitions.

Keywords: : planning, physical training, motor skills, physical tests.

Introduction

It is well known that motor abilities are indispensable components of physical activity, which ensure the possibility of making general or specific efforts, thus highlighting the (functional) potential of the body, in various populations: with or without disabilities, young, adult or elderly, athletes from different sports etc. (Alexe, 1993; Ungurean, 2008; Ungurean, 2009; Ungurean & Popescu, 2015; Oprean, 2011; Oprean, 2012; Oprean, 2013; Cojocariu, 2012; Abalașei, 2017). Moreover, the importance of motor abilities for performance in sport is linked sometimes with the studying the animals' biological parameters involved in competition: for example, study focused on effects of training programs on horses used for obstacle courses while jumping! (Murariu, Murariu & Gîlcă, 2014)

The most important motor abilities in martial arts are coordination (combining and pairing movements, spatiotemporal orientation, kinaesthetic sense, balance, rhythm, etc.), speed of reaction, of execution and of repetition, force-speed (power), force-resistance, and flexibility (mainly coxofemoral and spine). Concerning speed, the importance of motion rapidity for increasing the striking power is well-known; speed of execution and of repetition are also very frequently used.

During this motor ability training specific to martial arts, the exercises must be performed gradually by increasing the speed. The athlete must achieve the ability to execute the movements with maximum speed, in order to be applied efficiently in fights. In order to develop execution and repetition speed, it is recommended by execute short, intercalated series, with sufficient pauses for the restoration of exercise capacity. If long series are used, they may determine neuromuscular fatigue and a decrease of speed. (Cojocariu, 2016)

According to the literature, the most important physiological adjustments (improvements), due to the systematic practice of some martial arts, concern the choice reaction time (Cojocariu, 2010; Zemkova & Dzurenkova, 2004), power (force-speed couple) (O'Donovan et al, 2006; Voigt & Klausen, 1990) and sometimes the repetition speed.

Concerning the repetition speed, the poor literature specific to martial arts in this field shows it is measured usually in number of executions in 10 seconds (e.g. punches with one or both upper limbs, kicks with one or both lower limbs).

Thus, Silva Santos and Franchini (2016) studied the speed of repetition in taekwondo martial art. They found that a 9 weeks of taekwondo specific training could improve this motor ability and can be applied to specific performance. The same authors, in another recent research (Da Silva Santos & Franchini, 2018), found that the FSKT test (which include also a 10 seconds test for kicks) could be efficiently used in female athletes evaluation and to discriminate the performance.

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As I mentioned above, other several studies concerning the force-speed couple, partially involved in the rapid and repeated executions, attest the significant improvements through specific training in some martial arts. In an experiment conducted for 16 weeks using training specific to Karate, Voigt and Klausen (1990) have found a significant improvement of this combined motor ability in the lower limbs. Imamura et al. (1998) found higher values among advanced Karate athletes compared to the beginners, while Zemkova and Dzurenkova (2004) found – for the 10-second vertical jump test – higher values in adult Karate practitioners compared to young practitioners.

Therefore, the purpose of the current study is to highlight the effects of physical training, conducted in the pre-season and season periods, on the specific repetition speed of the lower limbs, in the martial art of Qwan Ki Do. We have started from the hypothesis that by using a judicious planning and proper means, we can achieve a obvious higher specific repetition speed of the lower limbs.

Methods

The experimental research was conducted throughout a period of around eight weeks, comprising 16 elite athletes, among whom 5 female athletes (group 1) and 11 male athletes (group 2). All of them are members of the national Romanian Qwan Ki Do team, who trained in that period for participating in the European Championship; they are aged between 20 and 33 and they have over 10 years of practice in this martial art.

2.1 Tests used within the research (names as they are used in the martial art of Qwan Ki Do)

Because of laboratory tests inconvenients, we used four specific field tests, easy to apply and interpret:

- Test 1: Truc Cuoc (direct kicks), with the front leg – 10 sec.: from a stance of choice (Dinh Tan Tien, Am Duong Tan or Tieu Tan), front leg of choice; execute kicks only with the front leg (contact with the floor between executions) for 10 seconds, at full speed. The number of executions is recorded.
- Test 2: Truc Cuoc (direct kicks), with the rear leg – 10 sec.: from a stance of choice (Dinh Tan Tien or Am Duong Tan), execute kicks only with the rear leg (back to initial position between executions) for 10 seconds, at full speed. The number of executions is recorded.
- Test 3: Hoanh Cuoc (circular kicks), with the front leg – 10 sec.: from a stance of choice (Dinh Tan Tien, Am Duong Tan or Tieu Tan), front leg of choice; execute kicks only with the front leg (contact with the floor between executions) for 10 seconds, at full speed. The number of executions is recorded.
- Test 4: Hoanh Cuoc (circular kicks), with the rear leg – 10 sec.: from a stance of choice (Dinh Tan Tien or Am Duong Tan), execute kicks only with the rear leg (back to initial position between executions) for 10 seconds, at full speed. The number of executions is recorded.

The athletes used the left or the right leg in front, on their choice.

2.2 Contents of training for the development of the speed of repetition at the level of lower limbs, throughout the experiment

The experiment took place throughout a period of around eight weeks, during the pre-season and season periods. The period was divided into 4 phases, each comprising around two weeks.

Phase I

In the first phase, we have used, within the specific circuits, exercises for developing the force-speed couple and repetition speed of the lower limbs, around four times a week; the general content of physical training is focused on influencing the anaerobic lactacid exercise capacity.

Phase II

In the second phase, we have also used force-speed and repetition speed exercises during circuits (five times a week), but with a differentiated content, with a general focus of physical training on the development of anaerobic lactacid power.

Phases III and IV

In the last two phases, we have also used force-speed and repetition speed exercises focusing on executing specific technical procedures during circuits (4-5 times a week), but with a differentiated content, with a general focus of

physical training on the development of anaerobic alactacid power and capacity. In addition to these sessions of dissociated physical training, within integrated systems physical training, we have also focused on the development of anaerobic lactacid and alactacid energetic systems, especially on practicing specific technical procedures, in conditions of maximum and supramaximum speed.

Results and discussions

After applying the initial and the final test to the two groups (female and male), we have processed the data statistically (using the SPSS 20 for Windows – Paired Sample Test and Independent Sample Test), featured in the Tables below (Tables 1 and 2).

Table 1. Results at the initial and final tests, in elite female athletes (group 1) in Qwan Ki Do (arithmetic mean ± standard error mean)

Test	Initial results	Final results
1. <i>Truc Cuoc (direct kicks), with the front leg – 10 sec</i>	17.4 (0.81)	19.2 (0.58) *
2. <i>Truc Cuoc (direct kicks), with the rear leg – 10 sec</i>	15.4 (0.24) \$	17.4 (0.67) *
3. <i>Hoanh Cuoc (circular kicks), with the front leg – 10 sec</i>	16.6 (0.4)	18.2 (0.48)*
4. <i>Hoanh Cuoc (circular kicks), with the rear leg – 10 sec</i>	14.2 (0.66) \$	16.4 (0.67) \$

Legend: * - significant difference (p < 0.05) compared to the initial test; \$ - significant difference in test 2 compared to the same result in test 1, significant difference in test 4 compared to the same result in test 3.

Table 2. Results at the initial and final tests, in elite male athletes (group 2) in Qwan Ki Do (arithmetic mean ± standard error mean)

Test	Initial results	Final results
1. <i>Truc Cuoc (direct kicks), with the front leg – 10 sec</i>	18.45 (0.43)	20.0 (0.52)*
2. <i>Truc Cuoc (direct kicks), with the rear leg – 10 sec</i>	15.72 (0.64) #	17.27 (0.55)* #
3. <i>Hoanh Cuoc (circular kicks), with the front leg – 10 sec</i>	17.63 (0.56)	18.72 (0.38)*
4. <i>Hoanh Cuoc (circular kicks), with the rear leg – 10 sec</i>	14.36 (0.7) #	16.09 (0.41)* #

Legend: * - significant difference (p < 0.05) compared to the initial test; # - significant difference in test 2 compared to the same result in test 1, significant difference in test 4 compared to the same result in test 3.

Because these are specific field tests and literature is poor in this direction, we have not found any data within other similar studies in Qwan ki Do.

Regarding the statistical analysis (using the SPSS 20 for Windows – Paired Sample Test), there were found significant progresses of the values between the initial and the final tests, in both groups and in almost all tests (excepting test 4 in female athletes).

The same significant differences (p<0.05) was registered between the results of the tests (between test 1 and test 2, between test 3 and test 4) in the two groups, in both the initial and the final tests (excepting between final test 1 and final test 2 in female athletes). From this perspective, we mention the highly significant progress (p<0.001) recorded by group 2 (male athletes).

On the other hand, we have not found significant results between genders (using the SPSS 20 for Windows - Independent Sample Test), in all initial and final tests.

The results and statistical analysis seem to confirm the two previous studies in taekwondo (Silva Santos & Franchini, 2016; Da Silva Santos & Franchini, 2018), underlining the beneficial influence of specific martial arts training on repetition speed in Qwan Ki Do male and female athletes, at the level of lower limbs.

Conclusions

The eight weeks of preparation, during the pre-season and season periods, in elite Qwan Ki Do athletes, conduct to important improvements in specific repetition speed at the level of lower limbs, in both male and female groups. Therefore, the hypothesis was confirmed.

The significant differences registered between test 1 and test 2, respectively between test 3 and test 4 in the two groups, in both the initial and the final tests, suggest a future tactical orientation to use especially kicks with the front leg when the situations require the maximum repetition speed.

In addition, a future research could compare the differences between the dominant and non-dominant lower limbs, in kicks with the front leg test and kicks with the rear leg test, in order to outline the tactical preferences and predispositions of the athlete.

We also found a similar values between male and female groups, suggesting the gender does not influence the repetition speed in lower limbs in these elite athletes.

Finally, we state the results of this research validate the preparation program, which could be used successfully in order to develop the specific repetition speed in lower limbs in Qwan Ki Do and other martial arts with similar effort

and regulations characteristics. Also, the results could conduct to the optimization of tactical fight plan in accordance with the athlete and its opponent particularities.

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Loads of a Specific Nature and Their Impact on the Organism of Female Judo Practitioners

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Abstract

This study allowed to determine the degree of impact on the organism of female judo practitioners of the standard dosed physical load of power and speed-power character, namely: the amount of muscle tension as a percentage of the weight of the athlete's own body, the body's response (cardiorespiratory system) to the standard load of women - wrestlers of various weight categories and qualifications: the HR, respiration rate after exercise and the speed of recovery processes, physical performance indicators, and also to carry out a comparative analysis of the efforts of female judo practitioners of different weight category and skill while performing the standard dosed physical activity of a specific nature. It was also found that the indicators of special endurance of female judo practitioners increases gradually from category to category, there is a big difference between the pulse rates at rest and after performing the standard physical activity, and the rate of return of the HR to the initial level, indicating the slow pace of adaptation processes to physical loads of power and speed-power nature occurring in the body of the examined athletes, and the need to carry out a differentiated approach in dosing loads of power and speed-power character, adequate to the qualifications, functional and physical preparedness of female judo practitioners.

Keywords: sports training, maximum test, standard physical activity of a specific nature, strength and speed-strength endurance, the heart rate (HR), pulse sum of recovery processes, recovery time.

Introduction

The successful performance of a wrestler at competitions of various ranks in many respects depends on the level of his/her physical, technical and functional preparedness, ability to resist the constantly increasing fatigue during combats, which in turn depends on the correctness of the selection of means and methods of training impact, ability to dose the load during physical exercises of a specific nature. When planning the motor tasks of power and speed-power character, it is necessary to carry out a differentiated approach, adequate to the physical and functional preparedness of an athlete.

For this purpose, we conducted a study, during which an attempt was made to determine the level of development of special physical preparedness of female judo practitioners.

Objectives of the study. To accomplish this goal, tasks were carried out to determine the response of the organism, the amount of work and effort applied by athletes in performing the maximum and standard dosed physical activity of a specific nature.

Research methods. During the study, the following methods were used: anthropometry (determined height, weight, length of the lower extremities were determined), heart rate (HR) by the method of intervalometry (Mruts I.D. 2003), the pulse sum of recovery processes (Brouha L. 1964), mathematical-statistical data processing.

The results of the study. The data obtained during the study made it possible to determine the degree of impact on the body of the maximum number of throws of a dummy weighing 40 kilograms per minute (Manolachi V.G, Mruts I.D., 2017), the duration and speed of throws (Figure 1) in the maximum test (Dorgan V. 1997) and individual parameters of the standard metered exercise (20 throws of a dummy within 4 minutes), namely: the amount of muscle tension as a percentage of the athlete's own body weight (Dud'ev V.P. 2008 & Zamyatin Yu.P., Tarakanov B.I. 1985 & Kaplin V.N., Eganov A.V., Sirotin O.A 1990), the response of the body (cardiorespiratory system) to the maximum and standard dosed load of female judo practitioners of different weight categories and qualifications (Dorgan V., Mruts I., Postolachi A. 2018 & Manolachi, Veaceslav 2003): HR and respiration rate before and after exercise, recovery time and pulse sum of recovery processes (Table 1 and 2), volume and power of a specific nature (Manolachi, Veaceslav 2006 & Dud'ev V.P. 2008 & Mruts I.D., Uvarov V.A. 1989) when performing the maximum test and the

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standard metered load (Tables 3 and 4). It should be noted that each “throw” includes raising and placing the dummy in a vertical position, taking a comfortable position for the next throw and the throw itself. Repeated performance by an athlete of actions in the same sequence during a test with the use of a specific load indicates that this test motor task is cyclical (Geselevich V.A. 1973& Manolachi V.G, Mruts I.D. 2017). The duration of each cycle, the speed of the throws in the process of testing of female athletes are shown in Figure 1.

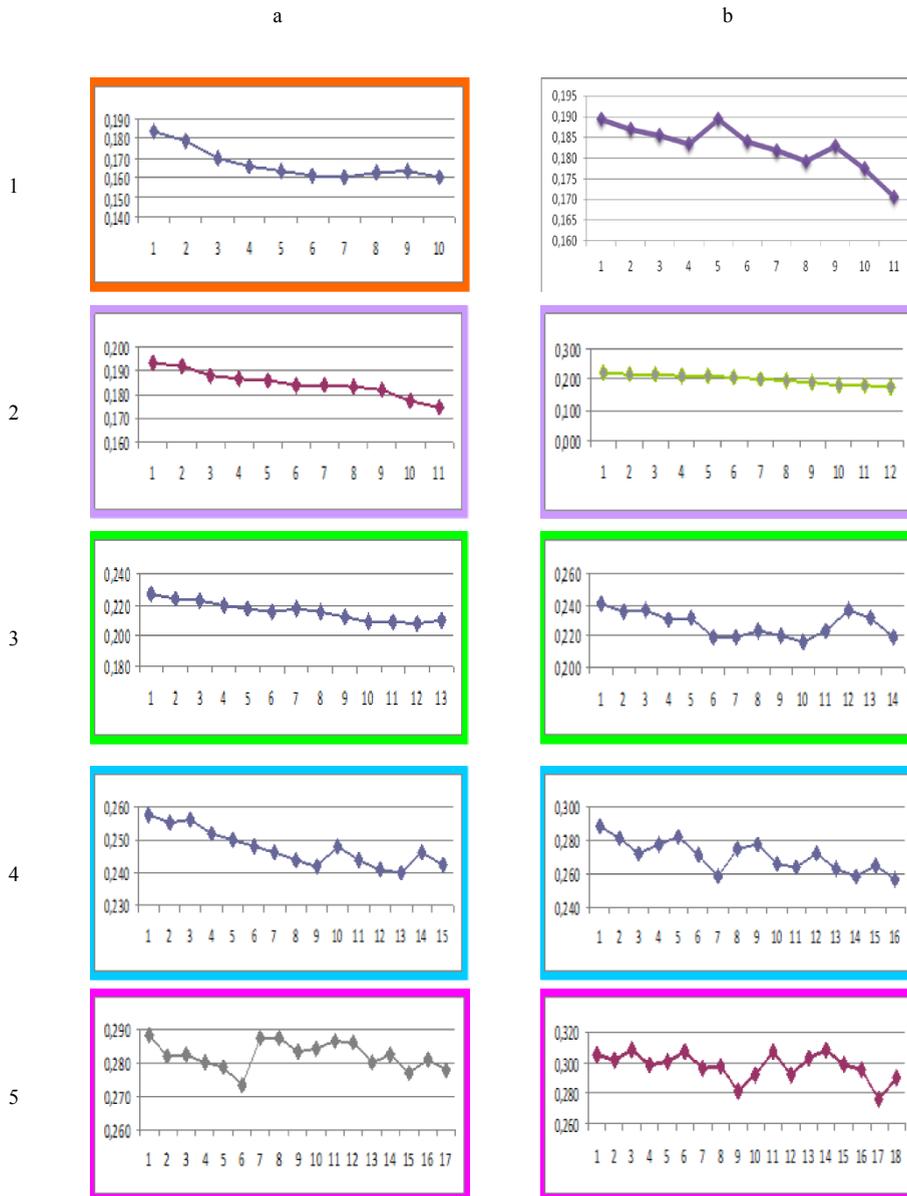


Fig. 1. Dynamics of speed of throwing by female judo practitioners of different weight categories (a - <48-63 kg; b - 63.1-78 kg) and qualifications (1 - no rank; 2 - III rank; 3 - II rank; 4 - I rank; 5 - CMS) when performing the maximum test.

For the convenience of describing the results of the study and comparing the obtained data, all the examined athletes were divided into five weight groups, each of which covers a range of 7–8 kilograms: 1– <48 kg; 2 - 48.1-57 kg; 3 - 57.1-63 kg; 4 - 63.1-70 kg; 5 - 70.1-78 kg.

Table 1. The reaction of the body of female judo practitioners of various qualifications and weight category when performing the maximum test (averaged data)

Qualification weight category	Number of subjects	Number of throws		HR at rest (bpm)		HR after exercise (bpm)		respiratory rate after exercise (pds / s)		Recovery Time (s)		Pulse amount of recovery processes (heart cycle pulse)	
		X	m	X	m	X	m	X	m	X	m	X	m
		CMS	7										
< 48 kg	2	14,5	1,35	65,31	3,18	186,76	6,21	0,44	0,04	293,12	13,12	248,4	26,18
48,1 - 57kg	2	15,0	1,16	66,17	2,96	184,23	5,13	0,48	0,02	273,05	7,38	238,8	21,13
57,1 - 63 kg	1	17,00	-	64,83	-	190,85	-	0,47	-	281,01	-	251,1	-
63,1 - 70 kg	1	18,0	-	67,28	-	192,55	-	0,46	-	285,62	-	260,9	-
70,1 – 78>	1	17,0	-	68,42	-	191,64	-	0,47	-	293,44	-	255,7	-
I rank	10												
< 48 kg	3	12,3	0,88	68,88	3,22	187,13	4,88	0,45	0,02	261,07	23,03	244,3	13,23
48,1 - 57kg	2	14,5	0,75	68,15	3,03	191,26	5,12	0,47	0,03	279,24	23,41	264,8	18,34
57,1 - 63 kg	2	16,5	0,44	70,12	3,21	189,33	6,26	0,45	0,03	288,17	23,87	249,1	16,43
63,1 - 70 kg	1	15,0	-	69,88	-	190,15	-	0,46	-	299,12	-	253,8	-
70,1 – 78>	2	16,5	0,33	69,45	3,85	199,66	5,88	0,45	0,03	291,22	24,65	264,5	13,17
II rank	11												
< 48 kg	3	13,3	0,45	67,11	2,28	194,61	4,93	0,47	0,02	276,65	18,44	266,2	22,41
48,1 - 57kg	3	13,3	0,24	66,57	2,81	189,93	6,18	0,44	0,03	279,34	18,16	274,3	22,65
57,1 - 63 kg	2	14,5	0,56	66,23	3,14	187,97	5,15	0,46	0,03	260,53	16,09	254,9	23,07
63,1 - 70 kg	2	13,5	0,43	68,34	3,62	189,16	5,78	0,47	0,02	327,77	23,58	248,8	13,26
70,1 – 78>	1	15,0	-	69,45	-	195,51	-	0,48	-	281,22	-	264,5	-
III rank	10												
< 48 kg	2	10,5	0,55	69,55	4,05	193,54	6,22	0,45	0,02	326,72	21,81	254,4	19,32
48,1 - 57kg	2	11,0	0,35	68,49	4,11	198,62	6,66	0,47	0,02	321,55	26,07	243,6	20,54
57,1 - 63 kg	3	11,3	0,35	69,13	3,89	189,84	5,87	0,46	0,03	280,71	24,4	247,9	14,13
63,1 - 70 kg	2	11,5	1,05	67,77	3,07	187,94	5,34	0,45	0,02	297,80	26,6	261,3	11,15
70,1 – 78>	1	12,0	-	69,45	-	188,66	-	0,44	-	281,22	-	254,5	-

The maximum test provided for a female athlete to perform as many throws of a dummy weighing 40 kg as possible over the shoulder within one minute (Manolachi, Veaceslav 2006& Dud'ev V.P. 2008& Manolachi V.G, Mruts I.D. 2017), and a submaximal, as opposed to the maximum, to perform 20 dummy throws over the shoulder evenly within 4 minutes (Manolachi V.G, Mruts I.D 2017 & Mruts I.D., Uvarov V.A 19890. In both cases, the HR was recorded at rest, immediately after the test (for the first 5-10 seconds) and during the recovery period every 30 seconds before returning to its original values (Brouha L. 1964).

From the graphs presented in Figure 1, it is clearly seen that when performing the maximum test, the rate of execution of the throws (cycles) is not constant, with a clear tendency of its decrease to the end of testing. It should be noted that for the first 30 seconds the judo wrestlers performed on average 60-65%, and for the second 30 seconds - from 35 to 40% of throws (cycles) of the total number of throws (cycles) shown during testing. This fact may indicate the level of development of their special physical and functional preparedness, the ability of athletes to resist the rapidly increasing fatigue, especially in the second half of the test.

Table 2. The reaction of the body of female judo practitioners of various qualifications and weight category when performing a standard (20 throws within 4 minutes) metered physical load (averaged data)

Qualification weight category	Number of subjects	HR at rest		HR after exercise (bpm)		respiratory rate after exercise (pds / s)		Recovery Time (s)		Pulse amount of recovery processes (heart cycle pulse)	
		X	m	X	m	X	m	X	m	X	m
		CMS	7								
< 48 kg	1	65,31	3,18	169,15	11,22	0,29	0,04	273,12	13,12	218,4	16,16
48,1 - 57kg	2	66,17	2,96	171,33	13,45	0,32	0,02	243,05	7,38	198,8	19,73
57,1 - 63 kg	2	64,83	-	178,89	-	0,31	-	251,01	-	221,1	-
63,1 - 70 kg	1	67,28	-	176,88	-	0,31	-	255,62	-	220,9	-
70,1 - 78>	1	68,42	-	179,12	-	0,31	-	263,44	-	225,7	-
I rank	10										
< 48 kg	3	68,88	3,22	166,55	7,89	0,30	0,02	211,07	23,03	214,3	10,25
48,1 - 57kg	2	68,15	3,03	169,87	10,11	0,31	0,03	229,24	23,41	234,8	13,19
57,1 - 63 kg	2	70,12	3,21	173,46	13,12	0,30	0,03	238,17	23,87	219,1	14,78
63,1 - 70 kg	1	69,88	-	176,13	-	0,31	-	249,12	-	213,8	-
70,1 - 78>	2	69,45	3,85	177,23	12,79	0,30	0,03	251,22	24,65	224,5	17,13
II rank	11										
< 48 kg	3	67,11	2,28	159,69	8,44	0,31	0,02	216,65	18,44	226,2	12,41
48,1 - 57kg	3	66,57	2,81	157,57	7,68	0,30	0,03	219,34	18,16	234,3	12,65
57,1 - 63 kg	2	66,23	3,14	161,46	8,38	0,31	0,03	210,53	16,09	214,9	13,07
63,1 - 70 kg	2	68,34	3,62	177,94	11,31	0,31	0,02	307,77	23,58	218,8	23,26
70,1 - 78>	1	69,45	-	177,23	-	0,32	-	251,22	-	224,5	-
III rank	10										
< 48 kg	2	69,55	4,05	188,17	12,07	0,30	0,02	296,72	21,81	204,4	21,32
48,1 - 57kg	2	68,49	4,11	189,98	11,83	0,31	0,02	301,55	26,07	213,6	23,54
57,1 - 63 kg	3	69,13	3,89	193,77	12,49	0,31	0,03	260,71	24,4	207,9	24,13
63,1 - 70 kg	2	67,77	3,07	184,31	14,12	0,30	0,02	257,80	26,6	211,3	19,15
70,1 - 78>	1	69,45	-	177,23	-	0,31	-	251,22	-	224,5	-

At the same time, a heavily broken line of graph of the speed of the throws in the second half of the test may indicate the degree of volitional efforts of athletes aimed at achieving a higher result, which also affects the indicators of test.

The maximum number of throws within one minute leads to significant changes in cardiorespiratory system indicators. At the same time, the HR indicators were recorded in the range of 186–200 beats per minute, which corresponds to an increase of 118–130 beats (170–200%) as compared to the HR indicators at rest. The greatest increase in the HR indicators was registered in female athletes of 3 categories of the weight category 57.1 - 63 kg. Respiratory rate increased from 11 to 12 respiratory cycles per minute at rest to 32-37 - at the end of the test (approximately 3 times more).

From the data presented in Table 2, it follows that the fulfillment of a standard specific physical dosage exercise - 20 throws of a dummy weighing 40 kg within 4 minutes also leads to significant changes in the functional systems of the athlete's body. However, the HR after the performance of the female judoists of the standard dosed physical exercise of a specific nature increases as compared with the pulse rates recorded before the start of the test ranging from 89 beats / min to 115 beats / min (141%).

The duration of recovery processes in female judo practitioners of various qualifications and weight categories is also very different: the return of the HR indicators to the original data most quickly occurred in athletes of the 2nd category of the weight category 55.1 - 60 kg (210.5 ± 16.09 seconds), and the wrestlers of the 2nd category of the weight category 60.1 - 69 kg (307.8 ± 23.6 seconds) recovered the longest. At the same time, the smallest pulse sum of recovery processes was registered with candidates for the master of sports in the weight category of 48.1–55 kg — 198.8 ± 19.73 full cardiac cycles.

When performing a standard dosed physical load - 20 throws of a dummy weighing 40 kg within 4 minutes, the efforts made by athletes of weight categories from <48 kg to 75> kg, the volume of work performed and its power are also not the same (table 4).

For example, when making a throw, depending on the weight (weight category) of wrestlers, the amount of external resistance in relation to the body weight of an athlete varies from approximately 53.12% in athletes in the weight category 69.1 - 75> kg to 84.75 % - for judokas of weight category up to 48 kg. At the same time, the capacity of the physical exercise performed is from 586 kgm / min for athletes of the second category to 726 kgm / min for the masters of sports.

Table 3. Comparative characteristics of the efforts of female judo practitioners of various weight categories and qualifications when performing the maximum test (averaged data)

Qualification, weight category	Number of subjects	Body weight (kg)		Number of throws		Effort in relation to own weight (%)		Speed of making throws (cycles) ((thr/s)		executed work (kgm)		Power of executed work (kgm/min/kg)	
		X	m	X	m	X	X	m	X	m	X	m	
CMS	7												
< 48 kg	2	47,4	0,25	14,5	1,35	84,39	0,242	0,01	887,1	11,3	18,72	1,33	
48,1 - 57kg	2	52,5	0,88	15,0	1,16	76,19	0,225	0,01	874,1	9,16	16,65	1,12	
57,1 - 63 kg	1	56,8	-	17,0	-	70,42	0,250	-0,01	1016,4	-	17,89	-	
63,1 - 70 kg	1	63,7	-	18,0	-	62,75	0,217	-	943,7	-	14,81	-	
70,1 - 78>	1	75,7	-	17,0	-	52,91	0,217	-	1052,8	-	13,91	-	
I rank	10												
< 48 kg	3	47,7	0,31	12,3	0,88	83,86	0,239	0,01	879,7	7,24	18,44	1,42	
48,1 - 57kg	2	53,5	0,46	14,5	0,75	74,77	0,242	0,01	949,0	8,32	17,74	1,38	
57,1 - 63 kg	2	57,5	0,82	16,5	0,44	69,57	0,250	0,01	1023,7	9,65	17,80	1,40	
63,1 - 70 kg	1	63,5	-	15,0	-	62,99	0,200	-	869,4	-	13,69	-	
70,1 - 78>	2	75,5	0,54	16,5	0,33	53,42	0,225	0,01	1091,4	9,17	14,46	1,02	
II rank	11												
< 48 kg	3	47,2	0,36	13,3	0,45	84,66	0,255	0,01	933,9	12,0	19,79	1,45	
48,1 - 57kg	3	51,5	0,89	13,3	0,24	77,67	0,267	0,01	1024,8	10,5	19,90	1,15	
57,1 - 63 kg	2	57,5	0,77	14,5	0,56	69,57	0,242	0,01	989,6	9,13	17,21	1,24	
63,1 - 70 kg	2	63,5	0,65	13,5	0,43	62,99	0,225	0,01	978,1	6,6	15,40	1,32	
70,1 - 78>	1	75,3	-	15,0	-	53,52	0,217	-	1049,2	-	13,93	-	
III rank	10												
< 48 kg	2	47,2	0,67	10,5	0,55	84,75	0,208	0,01	763,0	4,25	16,17	1,44	
48,1 - 57kg	2	51,9	0,78	11,0	0,35	77,07	0,225	0,01	868,4	6,35	16,73	1,28	
57,1 - 63 kg	3	56,7	0,45	11,3	0,35	70,48	0,222	0,01	900,3	8,15	15,88	1,33	
63,1 - 70 kg	2	64,5	0,39	11,5	1,05	61,97	0,242	0,01	1060,6	10,8	16,44	1,26	
70,1 - 78>	1	73,3	-	12,0	-	54,57	0,233	-	1110,3	-	15,15	-	

The work performed by female wrestlers within 4 minutes ranges from 2344 kgm for athletes in the weight category up to 48 kg, and up to 3812 kgm - for the female judoists in the weight category 69.1 - 75> kg.

The duration of recovery processes in female judo practitioners of various qualifications and weight categories also differs significantly: the return of the HR indicators to the initial data most quickly occurred in athletes of the 2nd category of the weight category 55.1 - 60 kg (210.5 ± 16.09 seconds), while the second-rate judo wrestlers of the weight category 60.1 - 69 kg (307.8 ± 23.6 sec) were the longest recovering. And the smallest pulse sum of recovery processes was registered with candidates for the master of sports in the weight category of 48.5 - 55 kg - 198.8 ± 19.73 full cardiac cycles.

Table 4. Comparative characteristics of the efforts of female judo practitioners of various weight categories and qualifications when performing standard dosed physical activity of a specific nature (averaged data)

Qualification, weight category	Number of subjects	Body weight (kg)		Effort in relation to own weight (%)	executed work (kgm)		Power of executed work			
							Absolute (kgm/min)		Relative (kgm/min/kg)	
		X	m		X	X	X	m	X	m
	7									
< 48 kg	2	47,4	0,25	84,39	2348,0	181,36	587,0	31,82	12,38	1,13
48,1 - 57kg	2	52,5	0,88	76,19	2450,0	158,84	612,50	25,38	11,67	1,02
57,1 - 63 kg	1	56,8	-	70,42	2536,0	-	634,00	-	11,16	-
63,1 - 70 kg	1	63,7	-	62,75	2675,0	-	668,75	-	10,50	-
70,1 – 78>	1	75,7	-	52,91	2906,0	-	726,50	-	9,60	-
I rank	10									
< 48 kg	3	47,7	0,31	83,86	2354,0	105,08	588,50	30,02	12,34	1,23
48,1 - 57kg	2	53,5	0,46	74,77	2470,0	91,39	617,5	26,11	11,54	1,05
57,1 - 63 kg	2	57,5	0,82	69,57	2550,0	102,21	637,50	19,20	11,09	1,14
63,1 - 70 kg	1	63,5	-	62,99	2670,0	-	667,50	-	10,51	-
70,1 – 78>	2	75,5	0,54	53,42	2906,0	-	726,50	-	9,62	1,00
II rank	11									
< 48 kg	3	47,2	0,36	84,66	2345,0	97,02	586,25	27,72	12,42	1,45
48,1 - 57kg	3	51,5	0,89	77,67	2430,0	123,75	607,50	35,36	11,80	1,15
57,1 - 63 kg	2	57,5	0,77	69,57	2550,0	118,62	637,50	33,89	11,09	1,24
63,1 - 70 kg	2	63,5	0,65	62,99	2670,0	114,77	667,50	32,79	10,51	1,32
70,1 – 78>	1	75,3	-	53,52	2906,0	-	726,50	-	9,65	-
III rank	10									
< 48 kg	2	47,2	0,67	84,75	2344,0	99,12	586,00	28,32	12,42	1,04
48,1 - 57kg	2	51,9	0,78	77,07	2438,0	111,45	609,5	31,84	11,74	1,00
57,1 - 63 kg	3	56,7	0,45	70,48	2535,0	97,65	633,75	27,90	11,18	1,01
63,1 - 70 kg	2	64,5	0,39	61,97	2691,0	104,31	672,75	29,80	10,43	1,01
70,1 – 78>	1	73,3	-	54,57	2827,0	-	706,76	716,50	9,64	-

When performing a standard dosed physical load - 20 throws of a dummy weighing 40 kg within 4 minutes, the efforts made by athletes of weight categories from <48 kg to 75> kg, the volume of work performed and its power are also not the same (table 4).

Thus, for example, when making a throw, depending on the weight category of wrestlers, the amount of external resistance in relation to the body weight of an athlete varies from about 53.12% for athletes in the weight category 69.1 - 75> kg to 84.75% for judokas of weight category up to 48 kg. At the same time, the capacity of the physical exercise performed is from 586, kgm / min (12.42 ± 1.45 kgm / min / kg) for athletes of the 2nd category to 726 kgm / min (9.60 kgm / min / kg) for masters of sport. The work performed by female wrestlers within 4 minutes ranges from 2344 kgm in athletes of the weight category up to 48 kg, and up to 3812 kgm - in the female judoists in the weight category 69.1 - 75> kg.

The data obtained in our research testify that indicators of special endurance of female judo practitioners gradually increase from category to category in the process of professional development of sportswomen. However, a large difference between the pulse rates in the examined judo practitioners at rest and after performing a standard physical load, and the duration of the return of the HR to the initial level, indicates slowed rates of adaptation processes to physical loads of power and speed-power nature.

Based on the above, we can draw the following conclusions:

1. Performance by female judo practitioners of the maximum number of throws within one minute (the maximum test) and the dosed loading of a specific nature (20 throws within 4 minutes) lead to considerable shifts in indicators of cardiorespiratory system. Reaction of an organism of sportswomen is in direct dependence on the power of physical loading, weight category and qualification of sportswomen.

2. The greatest indicators of the HR in judo have been achieved when performing the maximum test. It should be noted that the female athletes performed different in volume and intensity of the load, which corresponded to the level of their physical and functional fitness. The same can be said about the duration of recovery processes and the pulse sum of recovery processes.

3. The volume of work performed in the maximum test and its intensity (speed of throwing) are inversely proportional with the general tendency to decrease the speed of throws by the end of the test.

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Concepts Concerning the Content of Children's Training in Some Sport Games

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Abstract

The methods and instruments used for initiation and training the children as well as their adaptation to age and type of the practiced sports can have decisive effects both in terms of general and specific training. The way trainers approach training at this age level provide prerequisites and solid foundations for future performance. Starting from these aspects, the present paper aims at highlighting the concept of coaches from Oradea City regarding the approach of the general and specific training at the level of children, the instruments used in the training, as well as aspects regarding the participation of children in competitions. The data was collected using questionnaires and then was statistically processed. The conclusions of the present paperwork, to which all authors had same contribution, provide important milestones about trainer's working level at four from the most popular sports games: Handball, Football, Basketball and Volleyball.

Keywords: methods, instruments, trainers, questionnaire, handball, football, basketball, volleyball;

Introduction

The literature of sports offers a diverse and effective means of methodology on the development of motor skills (Buhas, 2015, Cristea, et al., 2013, McKenzie, 2007).

Sports games contribute to the development of general motor capacity, develop individual psycho-motor skills and, last but not least, constitute an important means of recreation and entertainment, while having a special and formative educational value of human personality and character (Szabo, et al, 2016, Kaiseler, 2012, Allen, et al., 2011, Saveanu & Buhas, 2015, Carreiro da Costa, 2005, Lucaciu, et al., 2014).

Practicing a certain sport discipline is clearly related to the technique of the game in question, which shows that the technique is accessible to all ages, is evolutionary and starts early. Of course, the approach must be seen in the context of the addressed age (Faigenbaum, 2000).

In order to learn more easily and faster, it is advisable to develop motor skills as early as possible (Chappell & Katene, 2010).

Stage character of sports training creates favorable conditions for the full use of the talent of small athletes. The movement from a simple motor skill to a playful game, complex and finally to the game itself, takes place over time with much toil and renunciation.

The four basic stages in preparation, according to some authors (Scurtul & Danilants, 2009) are:

- initiation stage, specific to children up to 11 years of age;
- stage of initial specialization up to 14 years of age;
- stage of sports perfection, up to 16 years, and
- stage of in-depth specialization up to 18 years of age.

In these phases, will be followed mainly aspects regarding techniques, tactics, physical and psychological training (Hampson, 2012, Woodman, et al., 2010, Sooneste, et al., 2013).

The technique will focus on educating the ball's sense and basic elementary skills, the tactic will be highlighted by field activity, orientation and mobility. Physical training will focus on motor coordination and joint mobility, all being subordinated to the formation of basic motor skills and the development of general neuro-muscular coordination

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(Buhas, et al., 2018, Dunbar, 1997). Psychological training (Bonchis, et al., 2009) will be accomplished by playing the game for fun, which offers moral satisfaction and an appealing character.

Ultimately, simple or complex motor action is the result of multiple forms of combining motor skills with technical elements (Thomas, et al., 2010). As simple as the structure of a motor action is, it cannot be sustained by only a single motor quality in isolation, but by a sum of combinations in different proportions (Ostojic & Zivanic, 2001).

It can be said with certainty that high-performance sport plays an important role in promoting talent, but let's not forget that the majority of today's stars have made their debut in amateur and junior team teams (Herman, 2016). This highlights the fact that children and junior teams are an optimal means for launching athletes to high performance (Dragos, 2014).

Aim

This study aimed at identifying the vision of coaches regarding the approach of general and specific training at the initial level of children (the stage of initiation), the means used during training, as well as aspects regarding their participation in competitions.

Research hypothesis

This research starts from the hypothesis that more and more coaches state that early selection and training of children with means specific for various sports games, as well as their participation in competitions from an early age can increase the level of performance. This aspect is corroborated with the coaches' desire to achieve sporting performance from the initial level of children stage without a general training background that can provide long-term results; thus, the physical and psychological consumption emerges too early. Also, the financial orientation toward profit of some clubs (especially private ones) leads to the disappearance of sport orientation process in relation to skills, which becomes late in most cases.

Objectives

The present approach aims at achieving the proposed goal by setting some operational objectives of theoretical and practical nature, as follows:

- literature review of national and international literature and the synthesis of current information;
- identify the main theoretical information on the initial selection and training of children;
- develop a questionnaire capturing the most important aspects of coaches' perception regarding the means used in training and participation in competitions;
- highlight the way in which sport orientation is present and is materialized at this age.

Subjects and methods

This research was based on a questionnaire applied to coaches from Oradea working at the children's level in four game sports that create the greatest emulation: Football, Handball, Basketball and Volleyball. The questionnaires, elaborated according to the specialized methodology, were firstly pre-tested on a number of 5 subjects, which led to the settlement of the questions. Following the pre-test, a number of items were reformulated and others were removed. The questionnaire was individually applied by direct contact.

Therefore, we interviewed 25 coaches. Of the total, 22 of them, respectively 88%, are male, and the remaining 12% are females.

In order to analyze data in relation to children's age, they were divided into three categories: baby, mini and youth. The baby category ranged in children under the age of 7, the mini category was ranged between 7 and 9 years and the youth category, over 9 years, up to juniors.

Results

In the opinion of the questioned coaches, the age at which specialized training can begin is in most cases between 7 and 9 years (56%). There are also opinions that the optimal age is between 5-7 years (28% of cases), between 9-11 years (8% of cases) and 4% of respondents state that it can start at the age of 11 years. A single answer indicates the optimum age being under 5 years. (Figure 1)

Also, the idea that an early specialized training would subsequently lead to a high level of performance was confirmed by 16 coaches, i.e. 64% of the total respondents, while 36%, i.e. 9 coaches, did not consider that an early specialized training is necessary for achieving higher performances at senior level. (Figure 2)

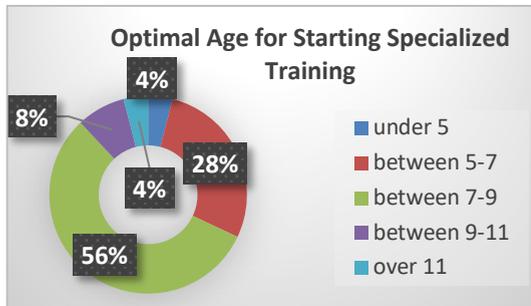


Fig. 1 – Coaches' option on the optimal age for starting the specialized training



Fig. 2 – Coaches' opinion on the relationship "early specialized training vs high performance level"

Regarding coaches' perception on the development of locomotors, non-locomotors and handling motor skills in relation to the age category, we found that:

- for the baby category, 54% of the respondents consider locomotors skills as being the most important, non-locomotors are considered the most important by 24% of the total number of respondents, while the handling ones are the most important for 22% of the subjects; (Figure 3)
- for the mini category, locomotors skills are the most important for 41% of respondents, non-locomotors for 36% and handling skills for 22% of the total respondents; (Figure 4)
- for the youth's category the answers were much more balanced; 38% of the total subjects consider locomotors skills as being the most important, while for the other categories the answers were divided, 31% for each category. (Figure 5)

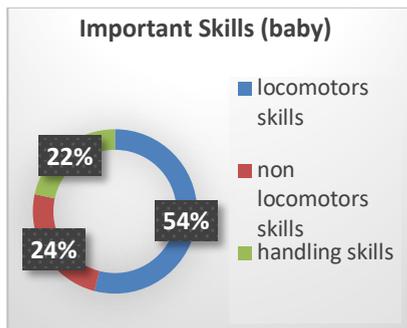


Fig. 3 Opinions on important skills to be developed for baby

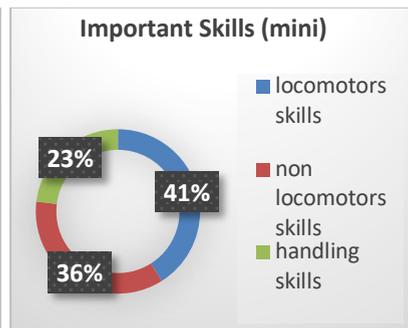


Fig. 4 Opinions on important skills to be developed for baby

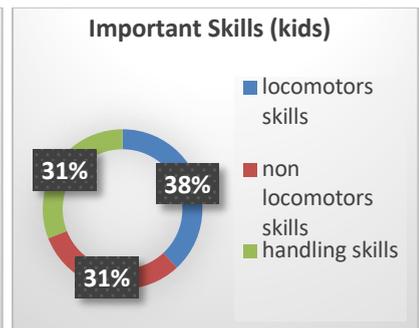


Fig. 5 - Opinions on important skills to be developed for kids

In order to complete the picture on the content of the children's training in the four sports games, we determined the share of the means used in the training by age categories. Thus, we found that coaches opted mostly for the use of means for developing general motor capacity in all age groups, but there is also a 31% of the total respondents who consider that specific means are most effective for the baby category. Only 27% of the respondents use dynamic games in this age category. The percentage increases slightly in mini and youth categories regarding dynamic games, but decreases for specific means category. (Figures 6, 7, 8)

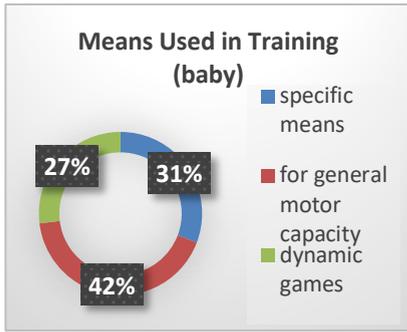


Fig. 6 Opinions on means used for baby

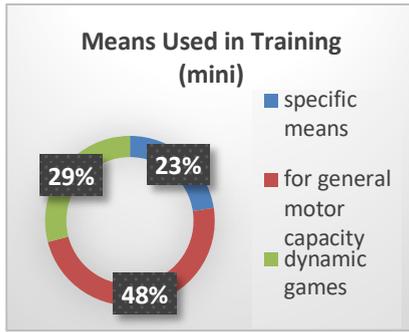


Fig. 7 Opinions on means used for mini

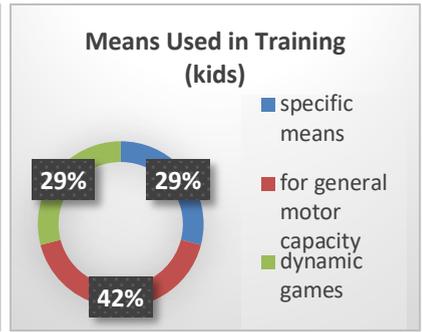


Fig. 8 - Opinions on means used for kids

Regarding the number of training sessions assigned to the preparation of the groups of youth players, fig. 3 shows that most coaches (44%) develop 3-4 trainings per week, 16% of them develop between 5-6 trainings, and 40% are doing 1-2 training per week. (Figure 9)

The time allocated for training is shown in figure 10 that shows that the highest share of respondents (56%) allocates a time interval between 80 and 100 minutes for a training session, 20% between 100 and 120 minutes and 24% between 60 and 80 minutes.

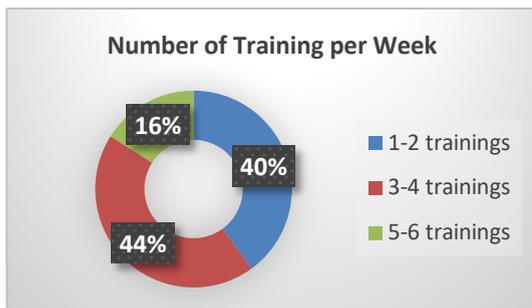


Fig. 9 - Opinions on number of trainings per week

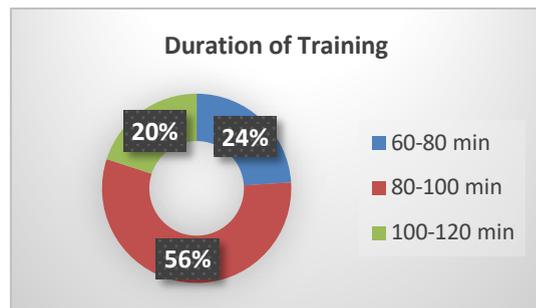


Fig. 10 - Opinions on duration of training

According to the majority of interviewed coaches (52%), the optimal age for children to compete is 7-9 years.

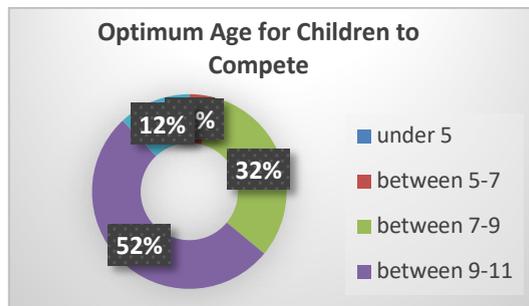


Fig. 11 - Share of opinions on optimum age for children to compete

A percent of 32% are those who consider that children can compete earlier, between 5 and 7 years, and only 4% of them consider that the optimal age is over 11 years. None of the respondents consider the participation of children aged less than 5 years in competitions to be normal. (Figure 11)

From the analysis of the data obtained from coaches regarding the sport reorientation process, it appears that it has completely disappeared. None of the coaches considered necessary to reorient the child to another sport, but they have only been refused to start or continue sports. In the overwhelming majority of cases, i.e. 80%, there are up to 20% of rejected children (Figure 12) mainly on behavioral grounds or inappropriate motor skills for a specific sport.

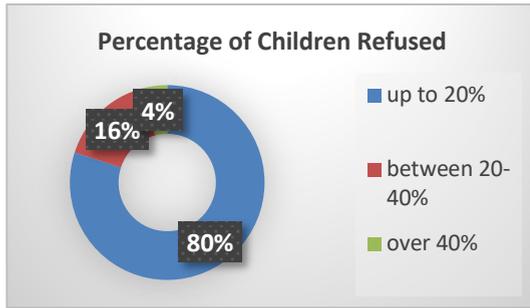


Fig. 12 - Share of refused children

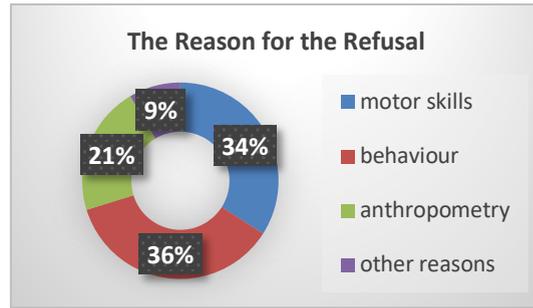


Fig. 13 - Reasons for the refusal of children

Discussions

Human resources (Hurrelman, 1988) are generally the transforming factor, the producer, always dynamic, regardless the type of activity, being the decisive element in achieving the progress of any organization. Thus, in the present paper, a fundamental role lies with the coaches who are able to effectively involve the team with whom they work to achieve the settled goals (Greendorfer, 1992).

In order to generate positive effects (sports performance), the human resource / coach must demonstrate a level of psycho-pedagogical and specialist competence of the highest quality, especially if we accept that the initiation in the practice of a sports discipline is the most important from the stages of sports training. We state that the comparison of motor skills acquisition at this stage with the alphabet learning stage in school education is not inappropriate. Thus, we may ask: is it necessary to train coaches in higher education institutions? (Buhas & Dragos, 2017). Is it useful to adopt an alternative form of training for coaches? If so, what is the minimum level of knowledge to be acquired? How permissive should this alternative form of training be? How easy (i.e. with how little effort) can you obtain the coach card?

On the other hand, making reference to the principle of complementarity, if we are talking about the human resource, we need to take into account also the other component (essential), which is the child / athlete who should be aware (by own skills), oriented (in the right direction), and motivated (especially intrinsic) (Dragos, 2014, Biddle, 1992; Santa, et al., 2017). It is obviously a paradigm conditioned by the level of professional competence and deontology that we mentioned earlier (Lucaciu, 2013).

Last but not least, some aspects need to be clarified taking into consideration that the basis of information / scientific training of all coaches should be unitary; we refer to the consistent diversity of coaches' opinions on:

- the optimum age for specialized training; is really the specialized training from an early age the key to performance?
- the number and duration of training (implicitly of the amount of physical effort) in relation to the physiological characteristics of the age;
- participating in competitions where the score and the place in the ranking have negative effects on children, especially in psychological terms.

Conclusions

Even if the coaches' opinion regarding the start of the specialized training (specific to the chosen sport) shows that the pressure appears quite early without a general base of motor skill training that is a solid starting point for achieving future performance, most of them, however, use during training specific exercise to develop general motor skills and locomotors skills.

The number of training sessions and their duration is quite high for these age groups, with the risk of premature physical and psychological consumption, which is also supported by the large number of competitions involving children from an early age.

Sport orientation process has completely disappeared, and children have to either give up practicing sports or try out other sports.

Taking into consideration the fact that lately the "selection" age has decreased excessively and training methods and means should be adapted to this change, without a scientific basis of training in relation to age, as well as well-trained coaches working with children, obtaining performance at senior level will still be difficult to achieve.

Even if this paper does not fully cover the complexity of the selection act, training and orientation of children towards practicing sports disciplines, it can contribute to the improvement of this activity, leaving the way open to relevant contributions in the field.

Acknowledgements

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Aspects Regarding the Influence of Communication on the Motivation of Employees in Some Sports Organizations

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Abstract

One of the biggest problems that may occur in an organization is the lack of communication. The organization should periodically transmit information about changes, objectives, strategy, achievements, etc. because the lack of such information may create tension, insecurity and may lead to rumors which is lowering the work motivation. Also, solving some problems (including personal ones) or internal conflicts depend on the way that the organization's leadership is willing to listen and understand employee's behavior at a certain time. Thus, by elaborating this paper, to which all authors have contributed the same, emphasizes the importance of communication and its role in increasing employee's motivation in sports organizations.

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Keywords: sport management, attitudes, information, leading, efficiency;

Introduction

The concept of motivation embraces multiple forms of expression and manifestation. It can be approached from several perspectives according to the specifics of activities and the situations in which they occur (Covell et al., 2007; Eagleman, 2013). Motivation is also generated by the self-esteem of employees, manifesting itself as an aspect of the social identity of the group as a unitary one (Bergami & Bagozzi, 2000). The very structure of sports organizations is conditional on institutional communication (Buhaş, 2015a; Gagne, 2005). Managing employees of sports organizations is a strategic challenge from a communication perspective (Taylor et al., 2015; Mowday, 2013; Cadwallader, 2010).

Taking into consideration the determinations of the man in any work process, as well as the motivating factors used, allows the understanding of motivation as a set of reasons - needs, tendencies, effects, interests, ideals, aspirations etc. - acts or systems of impulses, energies, discordant states etc. which triggers and supports the realization of behavioral facts, specific actions and human behavior (Popescu, 1978; Buhaş, 2015b; Dragoş, 2014; Mitchell, 2012; Grant et al., 2007; Sandhya & Kumar, 2011).

Today we live in the presence of the most advanced communications technology ever seen by man and this growth brings about possibilities and potential benefits to many situations, not least the management of sport in all its forms (Locke & Latham, 2002; Grant & Berg, 2012; Dragoş, 2015).

A survey by Watson Wyatt Worldwide Inc. among 100 US employers shows that 77 of them have sent or plan to send internal messages about the impact of the crisis on employees and implicitly on the company. More than two-thirds of them identified in employee anxiety, the main reason for intensifying internal communication. However, only 38% of them have spoken to employees about job security (Watt, 2003).

In the current context, the role of communication is vital in preventing internal tensions and conflicts (Pedersen, 2016; Fletcher & Wagstaff, 2009).

Research hypothesis

Within sports organizations, communication plays a very important role in stimulating employees in executive structures by creating a favorable climate, while the lack of it can lead to professional demotivation and, implicitly, can lower performance.

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Adopting a strategy based on the knowledge and accomplishment of people's needs, varying from one organization to another, can support the optimization of work performance.

Subjects and methods

In order to obtain conclusive and objective results, the main research method used for data collection was the questionnaire. The sample consisted of 200 people from 34 sports organizations at national level, including 60 managers and 140 employees in execution structures. The sampling was mixed (random and directed) due to the fact that sportive organizations of different sizes and statutes were considered, and within each type of organization subjects were selected primarily based on their willingness to answer the questionnaire.

Two types of questionnaires were developed, one for the managers and one for the employees; we managed to collect 178 valid questionnaires, of which 51 from the managers and 127 from the employees.

As a result, we note that 24% of the subjects work in small sports organizations, 27% of managers and 20% of employees belong to medium-sized sports organizations and 61% of managers and 68% of employees are from large sports organizations. Also, 29% of managers hold the position of director, 23% are vice-presidents, 12% are presidents, 12% are deputy directors, 12% are counsellors, 6% are financial administrators and 6% are administrators. In the case of employees or executives, the positions they occupy are quite varied. Most of them held the position of professor-coach (38%) or coach (24%), 8% are competition organizers, and 5% are heads of departments and 4% are referees. There is another category of 8% occupied by other posts (carers, drivers, etc.).

Regarding their age, managers aged between 46-55 years register 47% of the total, and those between 36-45 years and between 56-65 years are represented in relatively equal proportions, i.e. 24% and respectively 29% for the second category. Of those employed, 31% are under the age of 35 and between 46-55 years, 22% are ranged between 36 and 45 years, and the rest of 16% are over 56 years old. 88% of managers and 80% of employees are men.

Results

Our study indicates that in sports organizations included in the research, 53% of managers inform subordinates about the organization's strategic development and operational plans, which is particularly important in the current economic context. At the other side, only 6% of total interviewees never inform the subordinate staff about the organization's plans, while the rest of the respondents, 41%, sometimes only inform employees. (Figure 1)



Fig. no. 1 – The opinions of „managers”

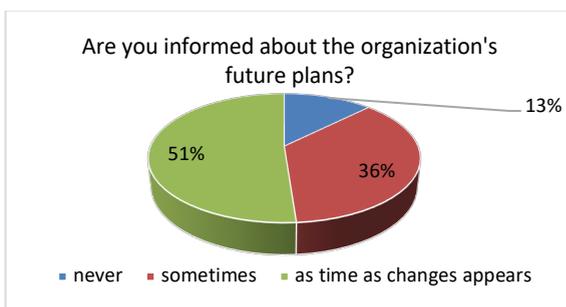


Fig. no. 2 – The opinions of „employees”

The situation is similar from the perspective of employees, who state, in a proportion of 51%, that they are informed about the organization's future plans whenever changes occur. Of the remaining respondents, 36% feel they are only informed at times and 14% never. (Figure 2)

The research provides us with the possibility to find that, for solving certain problems, 59% of the managers sometimes ask for proposals from the employees, 35% always and 6% never. (Figure 3)

In figure no. 4 is the opinion of the respondent "employees", their answers showing that 23% of them consider that they are always asked for opinions on problem solving and 64% only sometimes. The remaining 13% are in the category of those who are not asked for proposals to solve certain problems.

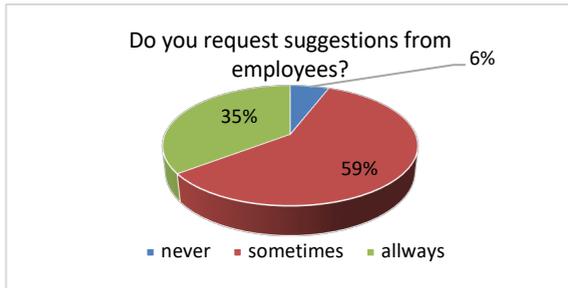


Fig. no. 3 – The opinions of „managers”

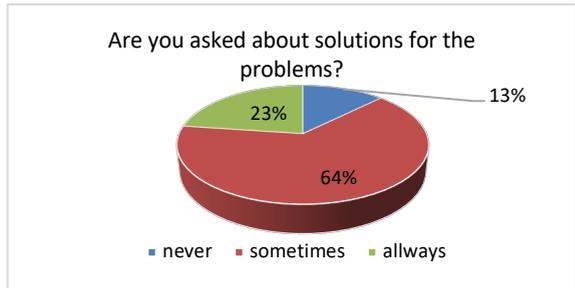


Fig. no. 4 – The opinios of „employees”

To the question "How much are the employees' conversations with their bosses encouraged to work? (activities, work problems), 47% of managers surveyed responded that they are much encouraged, 24% very much, 29% less, no respondent saying that these discussions are not encouraged at all.

The analysis of this question indicates that managers, however, encourage the discussions with the subordinate staff in a very high percentage (71%), a fact that is particularly encouraging in terms of motivation at work. (Figure 6)

The above conclusion is also reinforced by the responses received from employees, who say 67%, that managers of sports organizations encourage talks with them, 9% saying they are very common and 58% think they are frequent. The situation is different for 33% of the employees, the discussions between them and the superiors occur with a reduced frequency or almost no for 4% of the respondents. (Figure No. 7)

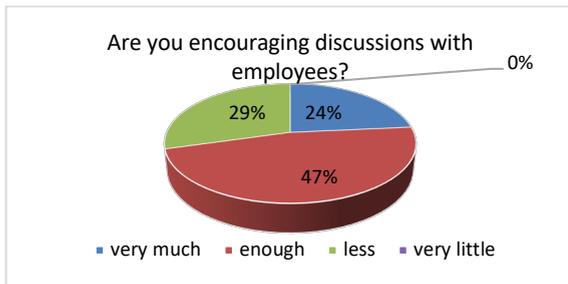


Fig. nr. 5 – The opinions of „managers”

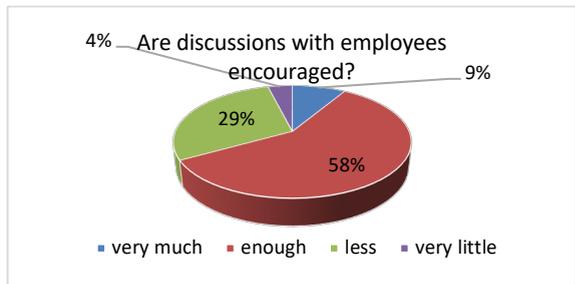


Fig. nr. 6 – The opinios of „employees”

Our research has addressed the attitude of managers in sports organizations about the situation in which employees have personal problems. After analyzing the answers, we can say that 71% of them listen to the problems of the employees and try to help them solve them when possible.

However, 6% of respondents say they do not discuss the employees' personal problems and 23% listen to them if they come to them to ask for a discussion, but they do not offer solutions or advice. (Figure No. 7)

The attitude of employees when they have personal problems can be seen in figure no. 8, where 53% of respondents say they only discuss with colleagues about such issues and only 8% address superiors in the hope that they will be more comprehensible about workplace work. The rest of the respondents also say they do not discuss with their superiors their personal problems.

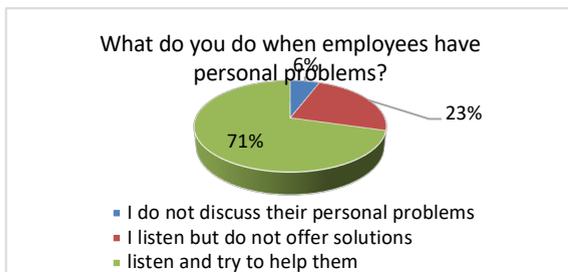


Fig. no. 7 – The opinions of „managers”

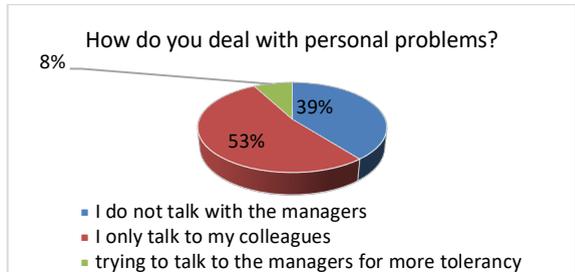


Fig. no. 8 – The opinios of „employees”

Discussions

The management does not necessarily forget the value of employees, but rather they perceives differently how this value is defined, highlighted and rewarded. Establishing appropriate communication between managers and employees can be a strong motivation for employees (Welch, 2011). It highlights an awareness of the importance of the human factor and the need to establish a level of communication to increase institutional performance. On the other hand, many of the employees are just used to execute as a habit, without getting involved, they don't know what to do when they are asked for their opinion and can't create their own opinion. Developing and establishing an optimal communication leads goes into institutional performance increasement (Givens, 2008). This fact, once acknowledged, leads to the approach of organizational strategies, so that the human resource responds positively to the influences of organizational management (Oreg, 2006). In this situation is important to develop an appropriate organizational culture in such of manner that employees feel a sense of organizational ownership (MachIntosh & Doherty, 2010).

The manager must demonstrate that he has leadership abilities and leadership skills. He must know the needs of the employees and help them in professional development. Also he must establish a balance between personal and professional life. Besides all of this, the most important thing is that the manager must know how to reward financially the work done by an employee. Also, institutional organization is a manager's quality that leads to the establishment of appropriate communication (Kalling, 2003).

Conclusions

Requesting employees to solve organization problem can be an important means of motivating for them. Due to the fact that employees feel "important" and at the same time respected by the people from the management, they are informed in time about the problems that appear in the activity of the organization, they consider themselves involved in the management of the organization. This fact creates an increase of motivation for execution staff.

Regarding the attitude of sports organizations managers about the employee's situation which have personal problems, 71% is a very high percentage, and, in terms of efficiency and motivation of staff, it can be said that they can only have positive effects on them. The employee's degree of appreciation for managers increases and their loyalty also.

The relationship of manager-employee must be based on respect and appreciation, be honest, friendly. If the manager will know to impose himself on the subordinates, to show them that they understand their professional and personal problems, support them in achieving their performance and reward them financially as they work, then the employee will try to satisfies expectations.

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Preventing the Onset of Burnout Syndrome in Athletes

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Abstract

The burnout syndrome has been defined ever since 1974 by Herbert Freudenberger as a state of physical, emotional and mental exhaustion caused by the individual's long-term involvement in strenuous situations. The effects of professional exhaustion are well-known in the corporate environment, where preventive programs that include mindfulness, professional development, massage in the workplace, etc. have been put in place in an attempt to try to prevent them. But high-level performance sports can also offer cases that fit the definition of the burnout syndrome. For sports medicine professionals, the symptoms are not new and have been previously described in specialty literature as athletic overwork. The novelty comes from two aspects: the very early age at which these situations can occur, and the subtlety of their manifestations – whose aspects can elude diagnosis (and therefore treatment) if they are quickly brushed over. The present paper aims to bring to attention two cases, both of children athletes who practice tennis, aged 11 and 12 respectively, and in whom the burnout syndrome manifested as a drop in their school performance. Through anamnesis and individual discussions, we have been able to identify the primary causes of the poor results in school – a combination of social and educational influences (both educational and athletic, and in both cases unadapted and not personalized), with ignorance and a lack of comprehension towards the child's identity. From my 16+ years of experience as mental trainer, I have noticed an increased frequency of cases **where the child's identity is ignored**: the coach is focused on the athletic side, the teachers concentrate on the knowledge they can impart to the child, the parents are much too preoccupied by providing for his basic needs. So who is left to look after the development of the child's identity in a world that offers so much information and where even as an adult it is difficult to discern who should be your role models?

The conclusion of the paper: preventing low performance at school and on the field, and implicitly the burnout syndrome, can be done by approaching this from at least four directions: education, understanding social influences, explaining the purpose of the academic and athletic effort, and developing individual identity.

Keywords: athletes, burnout syndrome, identity ignorance, mental trainer, NLP coaching

Introduction

Children with excellent sportive results – it has almost become something normal and found all over the world. But have we, adults, given any thought to the fact that a child works harder than we think: he goes to school, has homework to do, goes to athletic practice. When should he take care of his main “job” of being a child? A lot of children automatically give in to their parents' imperious demands on this matter, without knowing better. Others don't agree with what the adults say or ask of them, but have no other solution than to obey. And a significant number of children, while not fully understanding why they are on this strenuous path, have been educated to accept that the benefits of practicing sports will come later on in their adult life – this is an axiom quoted by many adults that the children have no way of contradicting. In this context, children become subject, at earlier and earlier ages, to **pressures from all sides**: family, school environment, friends, athletic practice.

In 1974, Herbert Freudenberger, a New York doctor, first used the term “burnout”; later, in 1981, Maslach and Jackson, quoted by M. Zlate (Zlate, Mielu, 1999), suggested the following definition for burnout: “a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who work with people in some capacity”.

Regarding the burnout syndrome in adults, we have already published an ample article in which we describe the contributing factors, the causes, symptoms and several steps that can be taken to prevent such cases. The information can be found in a summarized form (Drosescu, 2010) or in its full form (www.medicinasportiva.ro).

The burnout syndrome's main cause is a lack of acknowledgment of a person's own merits, of recognition from peers and from people in the hierarchy. The steps that a person goes through are:

- the exhaustion phase, where the person is subjected to very high pressures compared to the rewards he receives

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- the frantic race phase, where excessive devotion can push the person to deplete their energetic and motivational resources
- deep boredom, which leads to monotony and very little stimulation.

Authors Robin Vealey and Melissa Chase (Vealey, Chase, 2016) point out as noteworthy certain aspects concerning *a loss of sense, unsatisfied values, very high ideals and demands, considerable pressure from the environment, the loss of identity and of the sense of belonging to the group. These aspects might seem to lack importance or to be merely a joke, but they can block performance, and even determine personality changes.* Based on the definition of the syndrome, the aforementioned authors bring a very simple and clear perspective in their book “Burnout in Youth Sport”: **“a negative psychological and physical state in which the athlete feels tired, little capable of special achievements, and with little interest to continue practicing the sport that he/she loves”.**

In other words, the burnout syndrome in children can be defined as a mental exhaustion linked to success: high demands that come from multiple directions, that push them towards an unachievable perfectionism, and if that is not obtained then ideas of lack of achievement, nullity or failure set in. The only solution left to the child is to work even harder, which accentuates the fatigue, favors mistakes and sustains a perpetual state of physical and especially mental exhaustion.

The most frequently recognized causes of underachievement are: pressure in school, from friends, the demand for perfectionism coming from the coach or the parents, an authoritarian parenting style, a lack of personal life. Doctors from the Sports Medicine Team at Children's Hospital Colorado (<https://www.childrenscolorado.org>) consider that the burnout syndrome includes the following aspects:

- physiological or emotional stress; fatigue
- deficiencies of the immune system
- insufficient recovery time
- chronic fatigue
- sleep disorders – either an increase or a decrease in the number of hours
- changes in appetite
- pain in the muscles or joints
- a multitude of psychological, physiological or hormonal changes can appear in clinical tests
- basally increased cardiac frequency
- lack of enthusiasm or ambition
- mood swings
- difficulties in executing routine tasks
- irritability, irrational thoughts, the child becomes much too serious, starts to lack confidence in himself and in his results, doesn't know what his qualities are or who he is anymore
- more frequent injuries

In order to complete the general picture of the burnout syndrome, we would also like to note a few of the contributing factors (Drosescu, 2010):

- focusing on a particular sport from a very early age
- tournaments that overlap with the school holidays
- “type A” personality: ambitious, determined to win, self-motivating, but with a high level of anxiety, low self-esteem
- pressure for parents / coaches

Material and method

In the present paper, I will present two cases with nearly identical symptoms, the only differences being the age and the primary cause that triggered the symptom: social and school pressure (for the girl), paternal pressure (for the boy).

Brief presentation of the characteristics of each case: female child, aged 12, and male child aged 11, who have been practicing tennis for 4 ½ and 4 years, respectively. In both cases, parents requested me to begin coaching sessions because they have noticed a **decrease in their results** at school (the parents wished me to “motivate the child towards

school”, as they said; following discussions with the teachers, the parents mentioned a **lack of focus in class, apathy** and lack of participation in class activities).

On the other hand, the coach also said that the girl was **more and more irritable** on the tennis court (“she's not normally like this, she is a good and quiet child, but when she makes mistakes she becomes aggressive, she loses concentration, she doesn't hear anything she's told from the bench, she slams and breaks the tennis racket!”), said the father who accompanied her in competitions). The girl also admitted: a feeling of fatigue even from the moment she woke up, and which got worse through the day, an inability to focus, unhappy about what she is doing, she doesn't feel like she can keep training even though she wants to continue with tennis, unhappiness about not having friends because of not having time to play. It is also useful to mention that all the symptoms that the child described wasn't initially recognized, and was actually denied because of the fear of not continuing her training. After an insistent anamnesis and after winning her confidence, much to the surprise of her parents certain aspects began to emerge that they knew nothing about because they had not noticed the child's feelings and the aforementioned elements.

In the boy's case, the coach had noticed reactions of blockage, inhibition that he had in training sessions or competitions whenever his father was present.

Results and discussions

The approach used for these cases was in several stages, and we wanted to eliminate other causes that would be easier to treat than the traits of personality:

- through somatoscopy and somatometry we certified that the growth and development processes were within normal parameters
- we excluded possible medical causes – the health condition was certified by a medical consultation 7 days before our meetings
- the nutritional investigation revealed appropriate eating habits, but also a recent change in preferences: in the 3-4 previous months, the girl consumed more chocolate than she used to, without her parents' knowledge and in quantities of up to an entire bar per day. Also significant is the inception of the consumption of hot chocolate. Ingesting food items that are derivatives of cocoa means supplementing the energetic intake and generating endorphins, but also an emotional imbalance.
- Anamnesis showed insufficient hydration levels: the circulation of water in growing organisms doesn't by itself cause the onset of the burnout syndrome, but it is a contributing factor because internal homeostasis is not maintained
- obtaining information regarding the quality of sleep: particularly for organisms in the growth stage, sleep (the deep, slow phase) has an anabolic role, helping physical recovery, the synthesis of macromolecules (proteins, ribonucleic acid), whereas the rapid sleep phase (the second part of sleep) contributes to regulating the mechanisms of homeostasis, consolidating memory, recovery of the neuromuscular system, replenishing catecholamine deposits (who intervene in maintaining a state of vigilance), recovering mental tone and energy, and in concentration / focus. In the cases we presented, there was a vicious circle: poor academic results – allotting more time for homework instead of sleep – fatigue upon waking-up – poor results.

The burnout syndrome can manifest in one of the following sectors of life: family, school, friends and social entourage, athletic; in the present case, it impacted the **school and athletic sector**. Obviously, these are only the visible parts, but it is necessary to point out that mental pressures that are being put upon the child come from multiple directions: family, teachers, coach, friends, and on top of it all (cumulated or not) there is also social and self-imposed pressure. In order to be able to leave the manifest states of the syndrome, it was necessary to have a collaboration between child, parents, coach and mental trainer over the course of 6 months – initially we had weekly meetings (for the first 3 consecutive weeks), and then bimonthly – to which we also added phone calls for reminders.

The treatment plan that we applied had several different levels, but they were all aimed at helping the child develop his/her own identity and self consciousness, because this aspect was not addressed by coaches, parents or teachers.

The main directions of the treatment plan were:

- **Setting objectives for school and athletic performance** (Robbins, 2002): often, teachers and coaches are the ones who set objectives for the child based on the idea that “*he/she must...*” This can put pressure on children, because: they are being asked to do something they don't understand *why they should* do, *they are unclear* about the steps needed to reach the goals and quite possibly are *being scared* by the demand, *they are not asked* whether they are willing to make such an effort, they are being turned into executors – in other

words, *the objectives aren't their own*. Through persuasive communication, the child can be oriented towards the same objectives while at the same time being shown by the adult that his personality matters, that he is important. This kind of communication requires time and patience from the adult, but the results will far outweigh the expectations – this is the kind of communication that transforms the child from an executor into a partner, that gives him/her confidence in his/her own forces, helps him/her make decisions, take responsibility for his/her own reactions and become oriented towards him/herself and towards result / action. Objectives regarding school are rarely discussed, because the learning process is seen as an obligation, as a given that cannot be avoided, especially within the context of a rigid education system. If children were explained why they have to study a certain subject, what the purpose of a subject is, how it will help him in life, they would be more motivated in the learning process.

- **Correlating objectives with career projections:** even though the children might be at an early age, it is useful to create a bridge to the future. It is very possible for the options to change, but a style of thinking is created that will stay with the child and remain valuable in any situation: setting an agreed objective (a small step) helps to get closer to the individually-set objective (a bigger step), that opens up new options and opportunities to help moving forward. It is also a way of inducing the idea of a continuous process, of constant work that can be under one's own control.
- **Self-motivation:** this comes from setting objectives and individual priorities. Extrinsic motivation can only work for the short term, and maybe medium term, but it is no longer effective in adult life.
- Identifying and cultivating self-motivation will trigger a number of **states** that are **fundamental** in the **process of individual growth:** self-confidence, self-respect, self-control, relaxation, joy, calm, concentration. Self-confidence can be obtained only through repetitive and sustained actions on behalf of the child, but also by encouraging what would be useful to repeat. Some coaches or parents have a certain mentality of only criticizing what is wrong and to not underline what is correct, when the situation should actually be reversed: at least from a neurophysiology perspective, it is useful to emphasize a job well done so that the subconscious mind can recall and repeat it. When we stress the part that the child did wrong, the aspect that shouldn't be repeated is the one that's being focused on, and that's actually what the subconscious mind will recall. Because of the stress to not make a mistake, children strive to do something and fail. They lose their joy to playfully train, to play in general, to compete in the learning process not over grades, but over the joy of knowledge. Joy and relaxation are two emotional states that are fundamental in the learning or training process. Joy and relaxation lead together to an area of calm that helps manifest the solution that solves a situation, clarity in thinking and decision-making and that helps the child remember who he is, what he wanted to do and especially how to accomplish what he wanted to.
- After all previous steps are completed, a **state of concentration** is created. Often, the child is asked in a shouted voice to act, which diminishes from the start his chances for concentration: fear does not support concentration.
- Knowing one's **emotions and transforming the energy** that they can bring forth is one of the most useful aspects in the psycho-emotional development of children, but this is precisely what is not taught or studied in schools or within families. Affirmations such as :Get it together!”, “control yourself!”, “make sure you don't embarrass me!”, “you can't do anything!” etc can't help the child in any way in his quest to achieve a result, because we are again asking our child something he doesn't know *how* to do, we want him to ignore something that's happening in his body. Knowing his own emotions, making friends with them and turning them into an ally and partner would offer a lot more energy.
- **Encouraging the child to communicate the state he is in and what he feels** – this practice is frequently used in the educational system abroad, while in Romania he is very rarely asked about what he feels, if he is rested, if he feels he can perform, if anything is bothering him, what state he is in. Obviously high-level sports requires the athlete to train even on less good days, but the contents of the practice can be modified so that the new procedures and techniques can be learned when the athlete is in complete mental and physical health.
- Preparing for critical situations means anticipating the situations he is about to go through explaining possible obstacles, anticipating certain reactions. Such discussions are not just a monologue from the parent/ coach, but also imply the child's participation. In this way, we can simultaneously develop a thought process of the kind “in detail – in general”.
- Self-evaluation is like a series of road signs, that give information on the direction and the stages that are left to complete. It is beneficial if self-evaluation is done as a weekly habit, in order to correct deviations and lack of productivity early on.

- Visualization is a process that would be best included in the preparation for exams and competitions, especially since it is simple and has a creative, playful nature that children are used to
- Building a winner's mentality and internal dialogue are two of the pillars that are useful for building a strong personality. Internal dialogue is what each of us say to ourselves in our mind, how we encourage ourselves, the way we appreciate ourselves.

All these elements are like pieces of a puzzle that combine and match together perfectly and help to create a stable personality, that won't be influenced by the first lack of success that appears. They are like a building that takes shape gradually, but that also self-supports as it takes shape. But most important is the idea of consolidation through repetition.

Teachers and parents should understand that we live in an era of speed and informatization, where children are not responsible to fulfill the parents' failed aspirations, they are not robots who win awards and score points in charts.

Due to the fact that recovery and healing from the installation of the burnout syndrome is very difficult, it would be easier to prevent it through:

1. periodization of the training process and preventing over-training
2. attention on the training techniques that are used: if they are adapted, number of repetitions, forecasted increase in intensity of maximum 10% per week
3. constant progress is more desirable than rapid increases followed by long periods of stagnation
4. adapted recovery and healing process
5. rest period of 1 day / week
6. one month rest every 3 months
7. dialogue with the child / athlete – checking motivation

Conclusions

In an extremely dynamic and continually changing world, it is necessary for us adults to learn to communicate, to be more careful and understand childrens' needs. The frailty of personality structures should constantly be on the minds of those who are in charge of educational processes. At the same time, adapting programs / trainings to particular individual learning abilities will lead to preventing the onset of over-training / burnout syndrome at an early age.

The present paper wishes to underline the complexity of the educational problem, by stopping only on a few aspects from the multitude of possibilities.

Preventing educational and athletic failures and, implicitly the burnout syndrome, can be done by approaching at least four directions of work: education, understanding social influences explaining the purpose of scholarly and athletic effort, as well as the development of individual identity.

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Critical Analysis on the Delimitation of the Concept of Sports Marketing in the Context of Modern Sports Market

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Abstract

Sports marketing is not just a socio-economic field to which marketing science applies. The sport industry's divestiture, the economic dimension of sports market transactions, the generic complexity of sport as a product are just a few arguments that compel us to thoroughly discuss this argument. On the other hand, sports marketing is not a "unique" sector, completely different in terms of science and practice. Many of the strategies, techniques and tools used here are borrowed from traditional marketing concepts.

Taking into account the two approaches, we bring to attention to the fact that sports marketing is an extensive marketing specialization that involves a set of knowledge and applications common to all specializations as well as a set of specific elements imposed by the uniqueness of sport as a marketable product.

Keywords: sport, sports marketing, fundamentals, critical analysis

Introduction

In our effort to submit a coherent definition of sports marketing, we must keep in mind that the existing literature divides marketing specialists in two distinct groups (Constantinescu & Roșca, 2007):

- One of them envisions sports marketing as a new field of specialization within the general marketing theory, emphasizing the uniqueness of applying the classical principles and practices of marketing to the field of sport;
- The second approach sees marketing as a new applicative-scientific tool with a different outreach than general marketing, benefiting from a number of specific elements.

Unlike marketing, the management of a sports organization takes over from the general management practice and science, the degree of personalization imposed by the sport field being reduced (Nichifor & Onose, 2016). Sports marketing, however, is in a different situation.

Undoubtedly sports marketing is not just a socio-economic subject to which marketing science applies. The sport industry's divestiture, the economic dimension of sports market transactions, the generic complexity of sport products are just a few arguments that compel us to not to lightly address this argument. On the other hand sports marketing is not a "unique" sector, completely different in terms of science and practice. Many of the strategies, techniques and tools used are borrowed from classical marketing concepts.

Taking into account the two approaches, we can assess that sports marketing ultimately constitutes an *extension of marketing specialization involving a set of knowledge and applications common to all specializations as well as a set of specific elements imposed by the uniqueness of sport as a marketable product.*

In a sports organization, the success of marketing strategies points towards an operational approach. Therefore, the managerial dimension of marketing is oriented towards planning, organizing, managing and controlling specific activities. They can be *traditional*, resulting from the specifics characterizing each sport, but also *modern*, such as: stimulation of product testing through induced experiences, post-sale services, communication through special events etc.

According to the definition forwarded by a German author (Zollondz, 2007), sports marketing is a *branch of the science focused on organizing and managing a sports structure or organization, based on organizational and leadership knowledge, macroeconomics, psychology, sociology and human motricity.*

From the perspective of improving a sports organization's success on the market, this definition may suffice. But the marketing of the ideas circulating in the world of sports, sports stars, competitive events created by the sports

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industry and presented as specific products with unique traits requires a slightly different approach, namely one that emphasizes the marketing mix. The supporters of this idea (Blann & Armstrong, 2007) define sports marketing as the process of designing and implementing a set of activities such as production, pricing, promotion and distribution of a sports product or the outcome of a business developed in the sports world in order to meet the needs and desires of sports consumers, in accordance with the initial goals of the organization.

This vision manages to successfully define sports marketing as a refined blend of the managerial function of the organization and the new take on the classical concept of marketing mix. What makes us continue our introspection is the complexity of the argument surrounding sports marketing. Balancing the business objectives of a company with the consumers' wishes and needs is a challenge in any industry, but the world of sports is different, as it displays a multitude of features that make it unique. The intangibility of sports emotions, the competitive drama or the companionship of fans, the heterogeneity of behavioural reactions, personal experiences and interpretations, the uncertainty of the end result and the unpredictability of sports events, highly dependent on the whims of the weather, the perishability of the simultaneous production and consumption of the sports experience, as well as the behavioural dynamics, both at the individual and group level, producing fanatical consumers with irrational reactions, constitute, quite often, the general picture of the singularity and complexity characteristic to sports marketing. All approaches aimed at defining this domain should take into account this unique combination of features which deeply personalize sports marketing.

The uniqueness of sports marketing is supported by a famous statement (Jackson, 2004) which could translate as following: Why is it impossible to sell the feeling of togetherness induced in sport fans the way you sell soap? The answer to this question is as simple as it is provocative. The pathway to a solution leads us to separate sports marketing into three sub-domains and to define their efforts tailored to their specificity (see Figure 1).

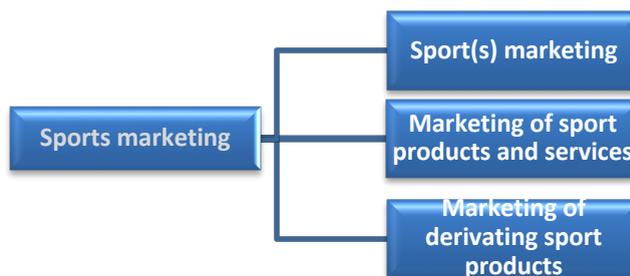


Fig. 1 The main sub-domains of sports marketing

The first subdomain defines the totality of efforts to support, develop, communicate and promote a particular sport. It helps create a sports identity that will further be communicated to the market in a competitive manner. It brings and keeps in the consumer's attention the current favourite sport or that which may become the favourite. It represents a set of quantitative and qualitative actions destined to invent or reinvent a sports trajectory, to transform a certain sport into a unique brand easily recognizable and appreciated by people. It is a strategic effort to support and disseminate the intrinsic characteristics of sports.

The first and the second subdomains are focused on sports marketing and sport products / services. This statement underlines a major dimension of sports marketing that is the application of marketing principles and processes for the marketing of goods and services directly to sports consumers (Gray & McEvoy, 2005)

The third dimension is the invasive marketing that deeply penetrates the world of sports to get to know it better and to learn to use all its knowledge to support products from other markets. Sport is used as a promotional device or as a sponsoring platform for various general or industrial consumer markets (Gray, & McEvoy, 2005)

As a result of the three above-mentioned dimensions of sports marketing, specialized literature provides a generic definition (Gray, & McEvoy, 2005): anticipating, managing and satisfying the needs and desires of consumers (athletes) using marketing principles and practices.

If we will attribute to sports marketing the second field, namely the marketing of sport products and services and we will only concentrate onto these two dimensions, we can report to the comprehensive definition offered by Mullin (Mullin, Hardy & Sutton, 2007), according to whom sports marketing includes all the activities designed to meet the consumers' needs and desires through exchange processes. The authors further entertain the same theory on the marketing of sport products and services offered directly to sports consumers and the marketing of other domestic or industrial consumer products or services through the mediation of sport.

We find the first part of this definition partially satisfying, since it combines the traditional theory of exchange with the contemporary version of customer satisfaction, we believe it is the second part which almost instantly raises the following question: are there any strategic initiatives other than promotion that can be used as a projection of sport that can fit into its theoretical and applicative field of marketing through sport? This makes us curious whether promotion through sport is the only useful application of sport in general marketing, which would greatly reduce the real perceptual dimension of sport. This theory on the real effects of using sport as a strategic marketing tool gives us a much wider perspective than promotion and public relations (Blann & Armstrong, 2003). Therefore, the creation of special events with the resources offered by the sport world and the range of emotions ignited by the competitive race can be two powerful examples that can help us understand the true limits of the role and place of sport in marketing practice. In this sense (Schlossberg, 1996), it is considered that sport has become a self-contained marketing environment with the ability to identify, segment, promote and distribute general products and services in a unique light, dominated by the heroic and dramatic aura of sport competitions.

Other authors (Brooks, 1994) argue that claims such as "sports marketing is no different from the marketing of a car or any other product" are no longer up to date. The researcher backs up his assertion arguing the fact that sport presents both tangible and intangible attributes, where the intangible elements (emotions, experiences) are intrinsically generated.

The arguments we previously presented support the existence of the two categories of characteristics, but the interaction of these forces, especially those of immaterial nature, makes the whole discourse more specific. Those behavioural responses characterized by the presence of very intense emotions that often generate even irrational responses, simply transforming sports fans into true fanatics of the phenomenon, justify the need for marketers to take into account some of the theories advanced in this field. Although not exclusive to the sport world, these axioms have a much higher incidence here (Sutton, 1996): the public consumption of the product sport and its dependency upon sharing experiences with other individuals or groups; perishability: after the end of a competition, the spectators only remain with their lived experience and its memory; unpredictability: the end of a sport competition is open to any possibility. All these aspects are very important when it comes to sports marketing and cannot be ignored. They are active and powerful in shaping the marketing effort, which is not the case when we talk about other product, such as a car, for example. Therefore sports marketing focuses more on the effects of the product and less on the product itself. By continuing to dissect the basic concepts of sports marketing, we consider relevant to our discourse the three principles stated by Fullerton et al in the paper already mentioned (Fullerton & Russell, 2008):

- the nature of sports marketing (sports marketing, marketing through sports);
- type of marketable product (related to sport or not);
- the level of integration of a sport within the marketing strategy (traditional or sponsorship-based).

To these principles, the authors add the four areas of the sport market delineated by the ambivalent level of integration of sport-specific content in marketing, and vice versa. The first category, called *sports themes strategies*, can be resumed as the effort to use traditional marketing tools that incorporate a sports theme into the marketing program for other products, unrelated to sport. The sports theme is in fact provided by the physical space of sports arenas where brands in the food, textile, electronics industry develop network units, the notoriety or social impact of a sport (for example, golf is considered an aristocratic sport and is therefore associated with premium products - watches, luxury clothing, top tourist destinations, exclusive flight companies) or triad sport event (victory) - socialization (desire to celebrate victory) - location (associated restaurant).

The second category - *product strategies* - represents the effort to apply classical marketing strategies to promote sport products. In this particular situation, we can discuss the traditional marketing effort of building communication, targeting, branding, positioning and differentiation plans that is only incidentally focused on a sport product. The price policies used to market a new type of sports shoe are apparently nothing more than traditional marketing and not sports related. Applying the various traditional marketing tools and methods in the sports world cannot be an independent effort. Viewed as a generic product, sport benefits from such an influential social presence that the marketer must take this characteristic into account and embed it in his efforts.

The third direction is represented by *the association strategies*. Many manufacturers of nonsportive brands express

their desire to formally associate their work with the sports world. This is usually done through one or more forms of sponsorship (see Figure 2).

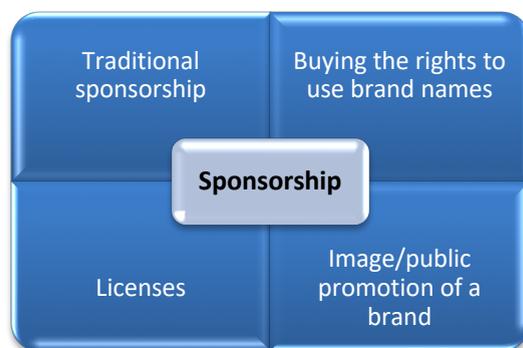


Fig. 2 Sponsorship - the characteristic tool in sports marketing

An already classic example is the various corporations' efforts to buy the right to name big sports arenas under their own names: Allianz Arena in Munich / Germany, Coca-Cola Stadium in Xi'an / China, T-Mobile Arena in Prague / Czech Republic, Pepsi Center in Denver / USA and so on.

The last field, *sport strategies*, defines the official sponsors of sports brands selling other sport products. Due to its ambivalent nature as a sport product and the integration of sport in the marketing program, this field best reflects the initiatives aimed at the sport world. Since the early days of sports marketing, sponsorship has been the binder that has strongly linked the two areas. A brilliant example is corporate sponsorship focused on promoters selected from the world of sports. Also known as personality sponsorship (Gillis, 2005), this is a method with a very strong impact on sport consumers in all its forms. Whatever type of sponsorship is taking place, the manufacturers in the sport world have become so strong that their sponsorship relationship has become permanent with major world sports events. It has become almost inconceivable that a brand such Adidas to not participate as an official FIFA partner. Thus, a unique communication synergy is created in the general marketing landscape.

Conclusion

By summing up all the information previously presented and analysed, we can argue that the effort to capture the essence of marketing in one totalizing definition, be it complex, is hard to accomplish. In a timid attempt to outline a critical conclusion and the future directions of analysis and research, we bring forward the following:

sports marketing is a concerted, qualitative and personalized effort to intelligently use the entire heritage of traditional marketing know-how in the unique environment offered by the sport world and to identify, integrate and bring added value to the ever-changing aspects inherent to sport in marketing theory and practice.

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Research on Perceived Competences In Primary School Students

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Abstract

Perceived competence is a self-perception of an individual in their capabilities and ability to control their environment and situation. It is how skilled and effective people perceive themselves to be in a particular situation. Individuals typically choose challenges that are suitable to their level of capabilities. Perceived competence is our expectancy that we can effectively interact with our environment. We believe we know what to do and can do what it takes to be successful. Increasing perceived competence could be accomplished by starting with small goals and tasks and increasing upwards to a level where the group or individual is most capable. Rewards and praise are important in increasing perceived competence along with constructive feedback. Children's self-concept is a core psychological construct and has been measured in an overwhelming number of studies. Self-concept is defined as how a person views oneself. Although sometimes used interchangeably with self-esteem and self-efficacy, self-concept is generally considered as a separate construct built on internal and external comparisons. *The purpose* of this research is to exploring the perceived competences in primary school students. In our study, the subscale "physical competence" from the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter and Pike, 1984) was applied to a group of 28 boys and 30 girls from the first grade (6-7 years). The same six items were answered both by the children (self-report) and by the physical education teacher who knows the children's abilities. *Results*. The children generally self-evaluate more strongly than their teacher assesses their physical competence, but the difference between these averages is significant only in the case of boys whose mean value is 19.6 while the average score of the teacher is 21.4 ($t=-3.06$; $p<0.01$). This research is a first step in exploring the competence perceived in small age students in the Romanian school environment.

Keywords: physical competence; self-perception; self-determination; self-efficacy.

Introduction

Often skill descriptions will spill over into actual demonstrations of one's abilities ("I'm really strong. I can lift this chair, watch me!"), or for girls ("I could bring my baby dolls to show you, next time"), suggesting that these emerging self-representations are still very directly tied to behavior (Harter, 2012).

In addition to a rudimentary display of self-awareness, another manifestation of the I-self is a sense of agency, the conviction that one has control over one's actions and thoughts (Lewis, 2000; Thompson, 2006). One's actions, as a causal agent, have a predictable impact on others or the environment. Thus, Jason describes how he "can kick a soccer ball real far" if there is an audience to see.

Self-concept, as a construct, is also used in studies of gifted students to assess characteristics of gifted populations and to measure impacts of the following programs: Self-Perception Profile for Children - SPPC și Self-Perception Profile for Adolescents - SPPA (Moritz Rudasill & Callahan, 2008).

Perceived competence is conceived in the theoretical framework of self-determination, while, self-efficacy is conceived in the theoretical framework of social-cognitive (Rodgers et. al., 2014).

Self-determination, as a psychological construct, refers to volitional actions taken by people based on their own will, and self-determined behaviour comes from intentional, conscious choice, and decision (Nota et al., 2011).

Self-determination of young people is fostered through positive development programmes, which target at promoting autonomy, independent thinking, self-advocacy, empowerment of young people, and their ability to live according to social values and standards. Such conceptualization is in line with the emergence of positive psychology which emphasizes fostering of human strengths (Hui, Sandra & Tsang, 2012; Seligman & Csikszentmihalyi, 2000).

First, self-efficacy is a belief about one's capability, generally speaking, and not to its capabilities in a certain area. A second important aspect of self-efficacy is the idea that individuals make use of their efficacy judgments in reference

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to some goal ('attain designated types of performances'), which reflects both the task- and situation-specific nature of efficacy beliefs. This aspect of self-efficacy stands in contrast to other, more general measures of expectancy, such as self-concept and self-perceptions of competence which, although they may be psychological domain specific, tend to be more global self-perceptions (Pajares, 1996).

Self-efficacy is concerned with perceived capability. The items should be phrased in terms of 'can do' rather than 'will do'. *Can* is a judgment of capability; *will* is a statement of intention. Perceived self-efficacy is a major determinant of intention, but the two constructs are conceptually and empirically separable. Perceived self-efficacy should also be distinguished from other constructs such as self-esteem, locus of control, and outcome expectancies. Perceived efficacy is a judgment of capability; self-esteem is a judgment of self-worth. They are entirely different phenomena (Bandura, 2006).

Self-acceptance is crucial to mental health. The absence of ability to unconditionally accept oneself can lead to a variety of emotional difficulties, including uncontrolled anger and depression. The person who is caught up in self-evaluation rather than self-acceptance may also be very needy and may devote considerable attention and personal resources to self-aggrandizement in order to compensate for perceived personal deficits.

One important aspect of self-acceptance is the ability and willingness to let others see one's true self. Living mindfully entails living daily life without pretense and without concern that others are judging one negatively. The person who lives mindfully is fully "in the moment" and is not worried about how he or she is coming across to others (Carson & Langer, 2004).

The term "self esteem" was first used by James in his *Principles of Psychology*, where he suggested that the self-esteem is of two kinds: self-satisfaction and dissatisfaction. As a logical relation, the self-esteem arises from the self-evaluation, a good level of self-esteem being related to self-acceptance (James, 1998).

Different authors suggest that there are individual differences regarding the level to which a person anticipates that interpersonal acceptance is conditional or unconditional (Cristian, 2013).

The degree to one's social environment is characterized by highly conditional acceptance represents an important indicator to self-esteem problems and mental health issues (e.g., anxiety, depression, low acceptance feeling and beliefs) (Baldwin & Sinclair, 1996). Studies were conducted also on the relation between irrational thoughts/attitudes and physical education activities (Lupu, 2011).

Using multidimensional conceptualization of the self-perceptions, Harter (1982) developed the Perceived Competence Scale for Children, a multi-dimensional measure designed to evaluate global self-worth and self-perceptions of adequacy across different areas of the self. Harter (1985) published one revision of the scale, the Self-Perception Profile for Children (SPPC), to assess global self-worth using five domains: scholastic competence, social acceptance, athletic competence, physical appearance, and behavioral conduct (Broc, 2014).

Material and method

The purpose of this research is to exploring the perceived competences in primary school students. In our study, the subscale "physical competence" from the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter and Pike, 1984) was applied to a group of 28 boys and 30 girls from the first grade (6-7 years) in the "Ion Simionescu" General School Iași. The same six items were answered both by the children (self-report) and by the physical education teacher who knows the children's abilities.

The items comprised in the scale were the following: item no. 1 – good at swinging by himself; item no. 2 – good at climbing; item no. 3 – good at bouncing the ball; item no. 4 – good at skipping; item no. 5 – run very fast; item no. 6 – good at jump rope. The results were obtained by processing them in SPSS, variant 20.0.

Results

Participants

The study involved a total of 58 first grade children, 30 girls and 28 boys, out of which 25 (13 girls, 12 boys) had extracurricular physical activities in specialized out-of-school clubs. Thus, the independent variables of the study are: the gender of subjects and their extracurricular activities.

Preliminary results

The perceived physical competence was self-assessed by child (physical competence -self-evaluation). For each participant child we collected the assessment of the physical competence evaluated by the physical education teacher of the class (physical competence -teacher evaluation). Self-assessed physical competence values ranged between 12 and 24 ($M = 20.24$, $SD = 2.44$) and those obtained on the basis of the teacher's assessment ranged between 16 and 24 ($M = 21.17$, $SD = 1.76$).

Hypothesis number 1

We expect the self-assessed physical competence to correlate with the teacher's assessments.

The result does not confirm the expectations and the two parameters does not correlate ($r=0.03$; $p=0.71$).

Hypothesis number 2

We expect the self-assessed physical competence to be higher than the teacher's assessments.

As we can see in the table below, higher values are obtained in the teacher's assessment and lower in the child's own self-evaluation. We again have results that invalidate the hypothesis. These differences are significant when calculating for the whole group, for boys and, respectively, for those who are not exercising in extra-school contexts.

Table 1. Paired samples t tests. Comparisons between physical competence - self-evaluation and physical competence - teacher evaluation, for all participants and separately for girls, boys, children exercising as extracurricular activity and children who do not exercise outside of school hours.

	All (N=58)	Girls (N=30)	Boys (N=28)	Extracurricular exercise YES (N=25)	Extracurricular exercise NO (N=33)
Physical competence -self- evaluation	20.24	20.76	19.67	20.60	19.96
Physical competence -teacher evaluation	21.17	20.90	21.46	21.32	21.06
t	-2.47	-.29	-3.06	-1.18	-2.25
p	0.017	0.76	0.005	0.247	0.031

Hypothesis number 3

We expect to find significant differences between girls and boys for both the physical competence -self-evaluation and the physical competence - teacher evaluation.

By performing t tests for independent samples we obtain insignificant differences both the physical competence -self-evaluation ($t=1.72$; $p=0.094$) and the physical competence –teacher evaluation ($t=-1.21$; $p=0.228$). So, the study hypothesis is invalidated for both girls and boys.

Hypothesis number 4

We expect to find significant differences between the children who were exercising as extracurricular activity and those who were not, for both the physical competence -self-evaluation and the physical competence –teacher evaluation.

The results show that the differences noted between children doing extra-curricular exercise and those who do not, are not significant either for physical competence -self-evaluation ($t=-0.972$; $p=0.335$) or for physical competence –teacher evaluation ($t=-0.550$; $p=0.585$). The study hypothesis is invalidated for both girls and boys.

Hypothesis number 5

We expect that gender and extracurricular physical activities have an interaction effect on physical competence -self-evaluation and on physical competence –teacher evaluation.

As we can see in the first figure below, the girl's self-evaluation of the physical competence is more favourable than that of boys ($F(1,56)=327.975$; $p=0.035$) and more favourable in children who have extra-curricular physical activities than in the others ($F(1,56)=106.432$; $p=0.062$). There is no gender interaction with extracurricular exercise in their effect on self-evaluation of the physical competence ($F(1,56)=0.009$; $p=0.926$).

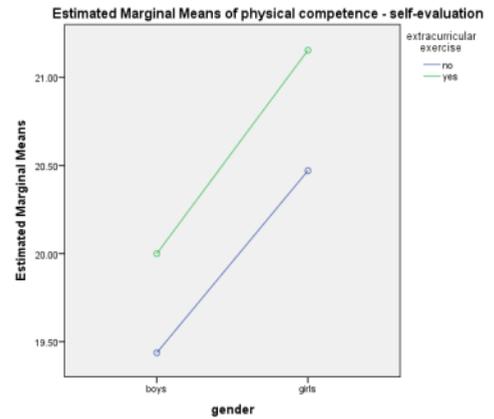
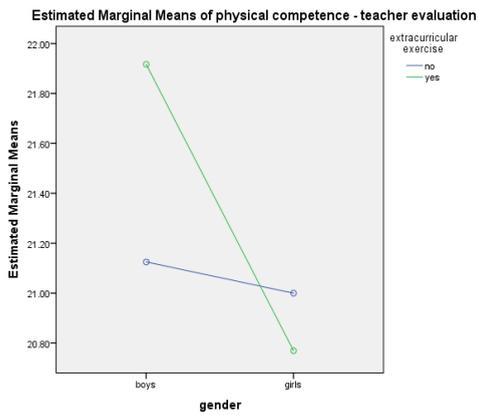
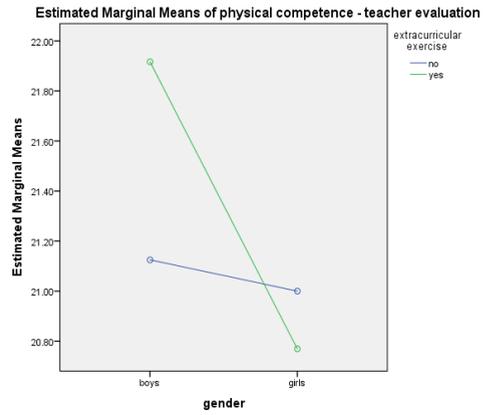
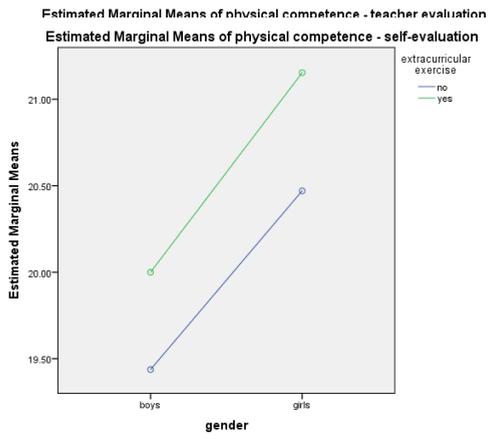


Fig. 1. Marginal means of physical competence – self-evaluation

Fig. 2. Marginal means of physical competence – teacher evaluation

In the second figure we can see that the teacher's appreciation of the class tends to be especially favourable for the boys who do extracurricular physical activities, but the results of the univariate variant analysis are not significant ($F(1,56)=1.186$; $p=0.281$).

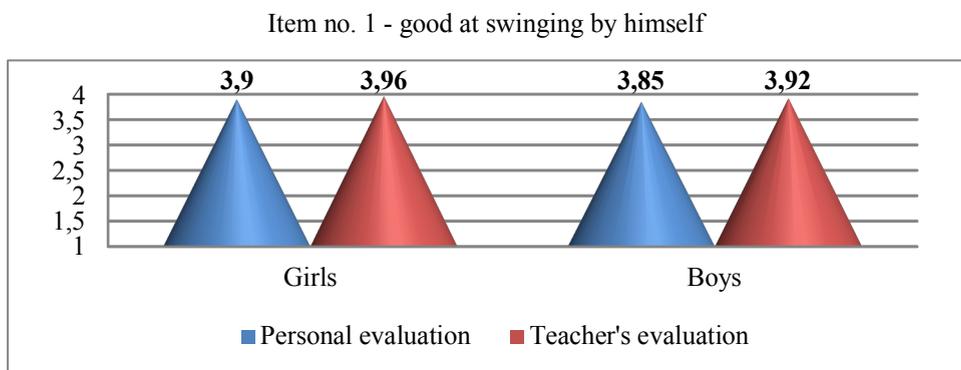


Fig. 3. Graphic representation of the arithmetic mean of personal evaluation and teacher's evaluation

In Graph 3, it may be seen that the means of scores of the teacher, relative to the personal evaluation, are close, the girls slightly better than the boys (0.06 in girls and 0.07 in boys).

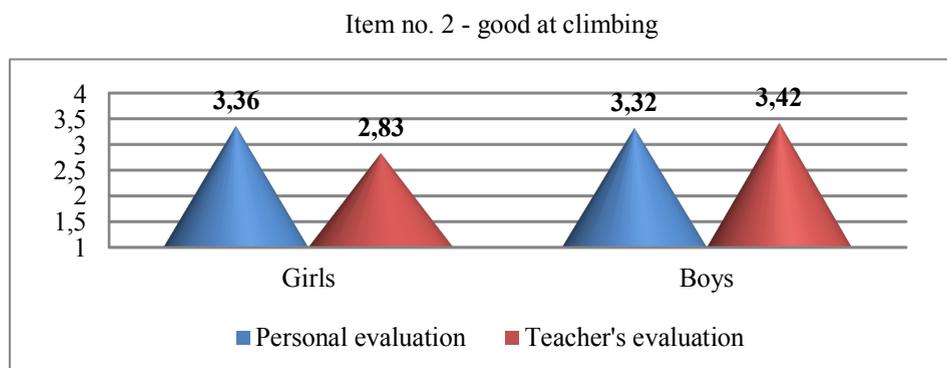


Fig. 4. Graphic representation of the arithmetic mean of personal evaluation and teacher's evaluation

In Graph 4 we notice that girls are self-evaluating slightly better than boys. Thus, the girls achieved a difference of 0.53 points, between the average points and the average points awarded by the teacher, and the boys have a difference of 0.10 points.

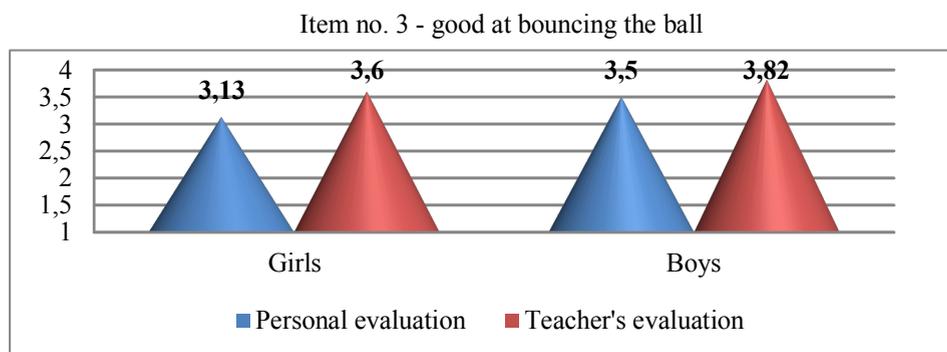


Fig. 5. Graphic representation of the arithmetic mean of personal evaluation and teacher's evaluation

In Graph 5, it may be stated that the means of the points granted by the teacher are higher by 0.47 in girls and 0.32 in boys compared to personal evaluations. Thus, we can notice that the boys have been more self-assessed than girls.

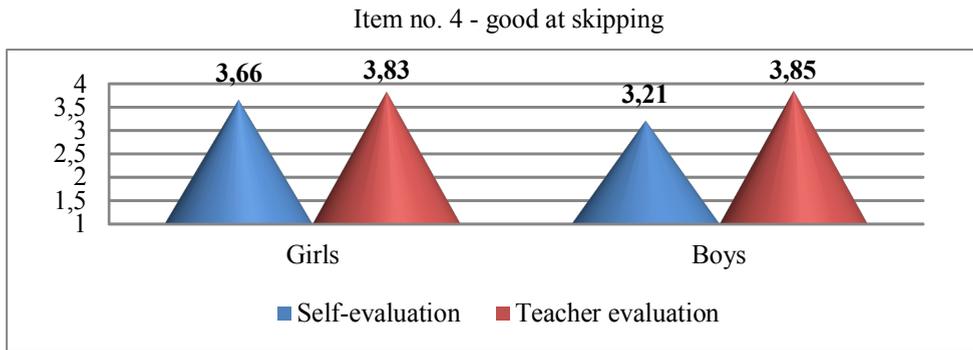


Fig. 6. Graphic representation of the arithmetic mean of personal evaluation and teacher's evaluation

Graph 6 shows that between girls and boys self-evaluation, there is a difference of 0.45 points in favor of girls (0.17 - girls, 0.64 - boys) and the difference between the average scores awarded by the teacher for both girls and boys is only 0.02.

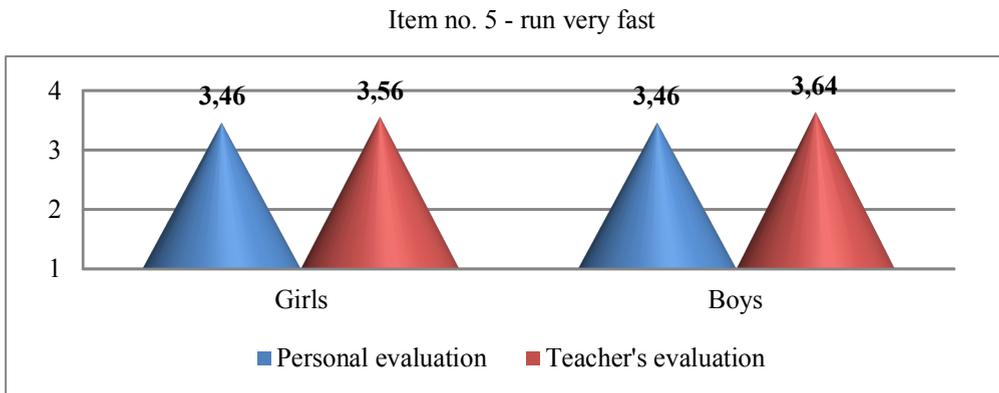


Fig. 7. Graphic representation of the arithmetic mean of personal evaluation and teacher's evaluation

In Graph 7, we see that both girls and boys obtained an equal mean after self-evaluation, while the difference between the two groups in teacher's evaluation is 0.10 points in girls, respectively 0.20 in boys.

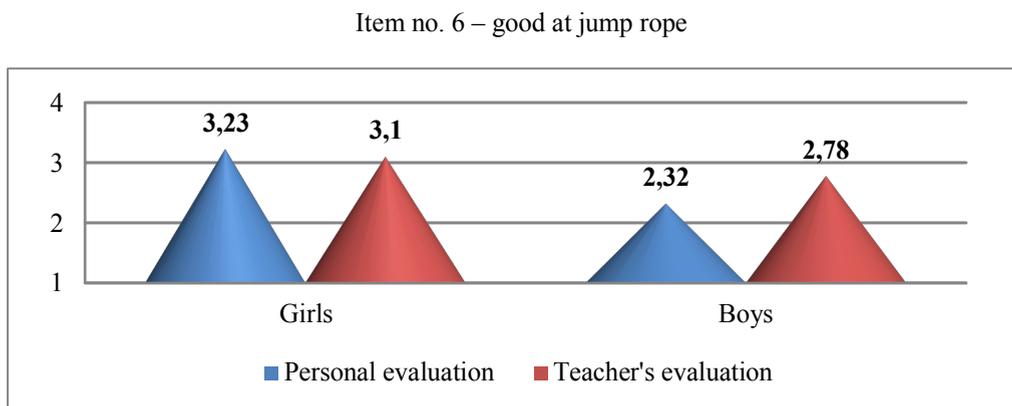


Fig. 8. Graphic representation of the arithmetic mean of personal evaluation and teacher's evaluation

Graph 8 shows a gender difference, of 0.91 points, between the two means in self-evaluation. Thus, we can notice that girls self-evaluated at 3.23 points, while boys at 2.32 points.

Conclusions

The level of perceived physical skills is lower in boys than in girls and lower in those who do not practice extracurricular sports. Teacher's evaluation does not correlate with the one made by children for themselves, and by comparing self-evaluations with teacher's evaluation, we see that pupils were significantly more severe.

Concerning the outcome of children's self-evaluations, in relation with the evaluation made by the teacher, we believe it would be necessary to compare these results with international findings, in order to observe cultural differences related to school assessment setting, which may induce more or less adequate performance standards related to the age of children in school. More precisely, in the Romanian school environment, children can be too severe in appraising their own physical skills, given the assessment practices used in various other subjects besides Physical Education.

A larger number of children participating in this research would certainly have added more clarity to the results. In the future, we propose to use instead of the class teacher, a group of neutral evaluators, in order to be able to better compare the self-evaluations with hetero-evaluations. We believe that the integral use of the tool developed by Susanne Harter, The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, 1984), would also bring much more precise information about psychological variables that are associated with the regularly physical exercises.

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Evolution of Anthropometric Indices in Handball Selection

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Abstract

Selection in children and further in the performance handball echelon is an important factor in achieving great performances. The aim of the research is to observe the level of development of the anthropometric characteristics of female handball players in order to be able to direct their sport training accordingly.

In this research we have watched for 1 year the evolution of 30 female handball players (age 11.5 ± 1.1), testing 13 anthropometric parameters. Thus, data that reflects the stature, weight, body mass index, pelvis perimeter, arm length, perimeter of pelvis, torso length, foot length, sum of skin folds, dominant palm length, palm opening, thigh circumference, calf circumference were collected. To check and direct the training of young female athletes we compared the indices obtained with the data from the literature and with the model provided by the specific literature.

Although our athletes have higher indexes than those analysed in similar research, we consider our research more recent and for this reason the somatic requirements of female handball players at this age echelon are slightly increased.

Keywords: anthropometric indices, selection, female handball players

Introduction

Constitutional factors are very important in choosing the sports branch (Pienaar et al. 1998, Damsgaard et al., 2001). Physical appearance and anthropometric features can be key factors that guarantee success in team sports (van der Tillar, Ettema, 2004, Ostojic et al., 2006).

Certain anthropometric variables, body composition and anaerobic performance variables have been tested to evaluate the effects of training and to provide coaches with valuable information for the selection of young players according to competitive requirements (Ugarkovic et al. 2002, Lidor et al. 2005).

Selection in children and further in the performance handball echelon is an important factor in achieving great performances. Together with other factors, such as the application of sports training science, the scientific leadership of the training process, the existence of a realistic and rational internal and international competition calendar, the provision of a proper material base, the perfect organization of handball activities at central and territorial level, the objective selection, and the scientific basis, make a decisive contribution to raising the level of handball performance both internally and internationally. The objective character and the scientific basis of the selection are assured only if the activity is carried out in full compliance with the main theoretical and methodological aspects of the selection.

Except for the beginner level, where the selection is horizontal only, the horizontal selection is continuously present at all other levels, and the vertical selection is performed periodically by promoting the upper echelon when age conditions are met, but especially those of training degree.

In handball, the maximum performance of male players and female players is generally at 22 years old (boys) and 20 years (girls). There may be exceptions, but their number is insignificant. In order to achieve this level of performance, handball players must overtake specialized training for about 8-10 years. Therefore, the child selected at some point, at the age of 10-11, will be able to enter the performance handball echelon after 8-10 years. In a period of 8-10 years there are qualitative mutations in the stage of development of the handball game in the world and, implicitly, on the domestic level, the game conception is updated, new models of players are elaborated at all parameters (somatic, motoric, psychic) and training models are improved.

The player model is a variable of the integrative model but also of the team model. In the profile of female players by positions, there are four criteria of appreciation (Colibaba, E. and Bota., 1998):

- skills for role by positions (somatic, motor, functional, psychic, psychomotor, biochemical etc.)
- training level (technical, tactical, physical, psychic and theoretical);

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- role played in game phases and systems (tasks by positions);
- expected individual performance.

The complex characterization of the athlete, in terms of physical development, it is necessary first of all in the selection, and further, until the growth ends. This is because the body has continuous and significant quantitative gains, resulting in changes in the amount and ratio of its components. But after 18-19 years is very useful the assessment of physical development. This is because the accurate knowledge of the percentage of body fat or total muscle mass are tools for evaluating the effectiveness of training and/or diet and keeping your weight under and under the limits of optimum weight, is formed in priority targets, required to be met in order to hope to achieve a sportive fit (Cazan et al., 2013).

The effort in handball is characterized by submaximal, alternating intensity efforts, depending on the actual playing conditions, with maximum intensity, average intensity or even pauses. As the player progresses to a higher level of performance, the higher the energy requirement and the overall stress of the game (Cazan, F., 2018).

‘Girls regularly active in a variety of team and individual sports (track, rowing, swimming, basketball, volleyball) present a pattern of growth that is characteristic of average maturing individuals’ (Malina 1994 a, b; Malina & Bielicki 1996).

Purpose

The aim of the research is to observe the level of development of the anthropometric characteristics of female handball players in order to be able to direct their sport training accordingly.

Methods and materials

It is known that the pattern of game by positions for the juniors IV is outlined by the specialized federations and includes a series of parameters to which coaches can report.

In this research we have watched for 1 year the evolution of 30 female handball players (age 11.5±1.1), testing 13 anthropometric parameters. Thus, data that reflects the stature, weight, body mass index, pelvis perimeter, arm length, perimeter of pelvis, torso length, foot length, sum of skin folds, dominant palm length, palm opening, thigh circumference, calf circumference were collected.

The experimental group followed a series of programs focusing on improving general physical condition in parallel with learning handball, aiming at creating a biomotor basis that guarantees the increase of the long-term performance capacity.

Table 1. Comparative anthropometric data.

Parameters for Female Juniors IV	Georgescu, A., Oltean, A (2018) (n=30)	Selma C.Y., (2012) n=30	Zapartidis.I., et.al (2009) n=42	Lanady,A., Roman, C. (2014) n=10	Fernández-Romero, J. J., et al (2017)	
					Regional level n=30	National level n=14
Age (years)	11.5±1.1	11.62±1.03	13.61±0.56	11.2	13.2±0.6	12.9±0.7
Height (cm)	160.33±8.79	151.68±6.18	163,18±5,53	153.6±65.31		
Body mass index (BMI) (Kg·m ⁻²)	18.78±1.79		21.32±2.92		21.8±2.6	20.5±4.1
Arm Span (cm)	163.93±10.68		165.73±7.63	154.6±6.56	164.7±7.4	166.5±9.2
Perimeter of pelvis	84.6±5.28					
Torso length (cm)	76.5±5.99					
Foot length (cm)	83.1±6.4				82.2±6.3	80.9±7.2
Arm length (cm)	52.8±4.07					
Weight (kg)	48.33±6.27	43.12±4.96		45.3±7.37		
Sum of skin folds (mm)	49.8±21.4				53.6±16.5	42.1±17.2
Length of dominant palm (cm)	16.95±1.39		17.69±0.79			
Palm opening	20.66±1.09		20.71±1.10			
Thigh circumference (cm)	22.9±5.5				21.9±8.1	25.5±6.8
Calf circumference (cm)	15.2±2.9				14.7±6.9	17.7±6.6

Table 2. Romanian Handball Federation somatic model on positions for female handball players - junior IV

Anthropometric indices	Extreme	Inter	Pivot	Leader	Goalkeeper
Height (cm)	168	175	168	172	171
Weight (kg)	64	74	67	69	67
Ratio T-100/G	1,06	1,01	1,01	1,04	1,05
Palm opening (cm)	21	22	21	22	21
Arm Span (cm)	176	184	173	178	181
Biacromial diameter (cm)	37	39	38	38	38
Bitrohanterian diameter (cm)	33	34	34	34	34

Discussions

To check and direct the training of young female athletes we compared the indices obtained with the data from the literature and with the model provided by the literature.

The study of the specialized literature revealed the lack of research for the 11-12 age group at the junior IV female handball players. However, we could report the measurements to 3 major studies in the literature.

The first study conducted by Selma, C.Y., (2012) was taken on 30 female handball players (aged 11.62 ± 1.03).

The second study on 10 female handball players aged 11.2 is the one made by Lanady, A., Roman, C. in 2014.

The third study is conducted by Fernandez Romero, J.,J., et al (2017), having as subjects female handball players that have been divided according to the level of performance - regional level (n=30) and national level (n=14).

By comparing the results obtained by us with the tests applied with the results found in the literature we can observe:

- The weight of the athletes in our study (160.33 ± 8.79 cm) is higher than that of the Selma, C.,Y., (2012) (151.68 ± 6.18 cm) and Lanady, A. (2014), ($153.6 \pm 6,31$ cm) and close to the results obtained by Zapartidis J.I., (2009), ($163,18 \pm 5,53$ cm), we should keep in mind that subjects in the study of Zapartidis, J.I., (2009) are two years older in age ($13,61 \pm 0.56$ vs. 11.5 ± 1.1 in our study);

- Upper limb length in our study is close to that obtained with Zapartidis JI 2009 (165.73 ± 7.63) and Fernandez-Romero, JJ 2017 (164.9 ± 10.68) 7.4 - regional, 166.5 ± 9.2 national) where the subjects are 2 years older. In case of the Lanady A 2014 study (154.6 ± 6.56) the results are lower than our research.

- In our study the weight of the athletes is 48.33 ± 6.27 being higher than the study of Selma, CY2012 (43.12 ± 4.96) and Lanady A 2014 (45.3 ± 7.37).

- As for the height of the subjects, we noticed a significant increase in the athletes tested by us compared to those tested in the 2012 (Selma, C.Y.) and 2014 (Lanady, A., Roman, C.) studies.

In fact, all the parameters compared are significantly higher than those in the targeted studies.

As a result of our measurements, we were able to direct the female handball players to a specialization on the basis of their special anthropometric characteristics and special requirements of the role they will play in the game.

Referring to the literature, we have noticed that there are not many concerns in the discovery of the guidelines regarding the orientation of young sportswomen according to the anthropometric indices

Conclusions

"The results demonstrate that many anthropometric and physical fitness differences exist among playing positions". as Zapartidis, I. et al said in 2011. Seeing the anthropometric differences of the subjects and comparing the indices obtained with those specific to the handball games, we were able to direct the physical and technical training of the handball players.

The comparative analysis with the results of similar research demonstrates the evolution of the anthropometric indices over time. This aspect confirms the importance of the anthropometric indices in the initial and specific selection for the subsequent orientation of the female athletes juniors IV.

The anthropometric characteristics of the occupied position determine the somatic type of the female player who will play within the team on a particular specialization. Although our athletes have higher indexes than those analysed in similar research, we consider our research more recent and for this reason the somatic requirements of female handball players at this age echelon are slightly increased.

The evolution of the anthropometric indices in the selection of female handball players (junior IV) leads to the orientation of the sports training and the subsequent specialized training according to the level of the parameters obtained in the applied tests.

The comparison of the anthropometric indices obtained by our players and those obtained by other researchers in other studies shows us a more sophisticated generation for the specific handball game requirements.

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Developed Jumping Power Relation with other Neuromuscular Coefficients from the Mgm-15 Jump Carpet

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Abstract

Background. We want to determine if a specific sports training program could improve neuromuscular and performance indices in female athletes measuring their jump power players **Subjects and Methods.** A number of 20 female basketball players with the ages between 9 and 11 years old participated in this study. We've used the MGM-15 Jump Carpet for evaluating the jumping power and other neuromuscular coefficients. **Results.** There was a significant statistical correlation between the energetic variability coefficient (EVC) and structural variability coefficient (SVC). There was a significant linear regression between the jump power and force-speed asymmetry. **Conclusion.** Both the structural and energetic coefficients refer to the same aspect of the neuromuscular process and therefore it was natural to identify a correlation. The linear regression discovered between the power output and the force-speed asymmetry can indicate that there is an impact over the rate of variance of the asymmetry with regards to the power output.

Keywords: MGM-15, basketball, power output, neuromuscular, force-speed asymmetry.

Nomenclature

Avg_UP – average power output

EVC – energetic variance coefficient

SVC – structural variance coefficient

FS_Asym – force – speed asymmetry

Introduction

Many training programs have been developed to improve player fitness and skill and hypothetically prevent injuries. Investigations vary considerably in the selection of subjects, duration of training, exercises and drills performed, and outcome measures. Only one study to date assessed performance indices in female basketball players using the Sports metrics training program (Wilkerson, GB, et.al., 2004.).

A small group of female collegiate basketball players obtained significant improvements in hamstring peak torque ($p = 0.008$), which were not found in the control group of players. Development of hamstrings strength is believed to be

one important factor in preventing knee ligament injuries in female athletes (Alentorn-Geli, E., Myer, G., et. al., 2009.)

Another study says that Sports metrics neuromuscular training for female athletes involved in a variety of sports 15 years ago (Hewett T., Lindenfeld T., et. al., 1999) and noted occasional problems with player compliance with the program. The training consisted of a dynamic warm-up, jump training, strength training, and flexibility. Over time, players and coaches requested that the program be modified to include additional sport-specific exercises and drills designed to improve speed, agility, strength and aerobic conditioning. In addition, other investigators noted that improved compliance with injury prevention training programs would most likely occur if the programs target performance enhancement and neuromuscular retraining (Kelly A. 2008). Therefore, to increase player compliance and participation, they developed sports specific programs for competitive female high school players involved in basketball, soccer, lacrosse, volleyball, and tennis. These training programs included the essential Sports metrics neuromuscular retraining principles previously proven to decrease the rate of noncontact injuries in female athletes, along with other sports specific exercises and drills. All the athletes who participated were enrolled in prospective

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studies in which neuromuscular and performance indices were measured before and upon completion of the training program.

Another study was undertaken to determine if a sports-specific training program could improve neuromuscular and performance indices in female high school basketball players. A program was devised, which used the dynamic warm-up, jump training, strength training, and flexibility components from a previously published ACL injury prevention program (Barber-Westin S. and Noyes F., 2009.), along with new exercises and drills to improve speed, agility, overall strength, and aerobic conditioning. A battery of tests was conducted to determine the effectiveness of this training program in improving lower limb alignment on a drop-jump test, estimated V_{O2max} , vertical jump height, and sprinting speed. Improved lower limb alignment while landing on a drop-jump test is believed by others to decrease the risk of occurrence of a noncontact ACL injury (24), although V_{O2max} , vertical jump height, and sprinting speed are essential components of this sport.

In the video drop-jump test, statistically significant increases were found between pretrained and post trained test sessions on landing in the mean absolute knee separation distance ($p, 0.0001$), the mean normalized knee separation distance ($p, 0.0001$), and in the distribution of the subjects in the normalized knee separation distance categories ($p, 0.0001$). Improvement in the normalized knee separation distance was demonstrated in 91% of the subjects. A statistically significant improvement was found in the mean estimated V_{O2max} score ($p, 0.0001$) and in the difference in the distribution of the subjects in the categories between pretrained and post train test sessions ($p, 0.0001$). Eighty-nine percent of the subjects improved this score. A significant improvement was found in the vertical jump test ($p, 0.0001$), as 70% of the subjects increased their scores. However, the effect size was small (0.09). There was no significant improvement in the 18-m sprint test. No subject sustained an injury that resulted in loss of time training or that required formal medical attention. All the subjects attended at least 14 of the 18 training sessions. (NOYES R.F., BARBER-WESTIN D., et. al., 2012)

Other study was to determine if female high school basketball show neuromuscular differences during landing and cutting tasks and to examine neuromuscular differences between tasks and between dominant and nondominant sides. Their purpose was to compare the lower extremity biomechanics of jumping and cutting in female basketball and soccer players. The general hypothesis was that female basketball and soccer players would demonstrate different neuromuscular control strategies when performing jumping and cutting tasks. The first specific hypothesis was that basketball players would have greater valgus knee moments, valgus knee angles, and vertical GRF than soccer players during a drop vertical jump (DVJ). Conversely, the second specific hypothesis was that soccer players would have increased valgus knee moments, valgus knee angles, and vertical GRF during the unanticipated cutting task. The third hypothesis was that side-to-side differences in knee valgus moments, knee valgus angles, and vertical GRF would exist in the groups of female athletes. Their subjects demonstrated differences in ground reaction forces and stance times during 2 movements associated with noncontact anterior cruciate ligament injuries. Knee valgus moment and angle were significantly influenced by the type of movement performed. Sport-specific neuromuscular training may be warranted, with basketball players focusing on jumping and landing and soccer players focusing on unanticipated cutting maneuvers. (Hanni R. Cowley., Kevin R. Ford., et. al. 2006).

Poor balance has been associated with increased injury risk among athletes. Neuromuscular-training programs have been advocated as a means of injury prevention, but little is known about the benefits of these programs on balance in high school athletes. To determine whether there are balance gains after participation in a neuromuscular-training program in high school athletes, in this study 62 female high school basketball players recruited from the local high school community and assigned to a training ($n = 37$) or control ($n = 25$) group. Training-group subjects participated in a 6-wk neuromuscular-training program that included plyo-metric, functional-strengthening, balance, and stability-ball exercises. The authors found a significant decrease in total BESS errors in the trained group at the posttest compared with their pretest and the control group ($P = .003$). Trained subjects also scored significantly fewer BESS errors on the single-foam and tandem-foam conditions at the posttest than the control group and demonstrated improvements on the single-foam compared with their pretest ($P = .033$). The authors found improvements in reach in the lateral, anteromedial, medial, and posterior directions in the trained group at the posttest compared with the control group ($P < .05$) using the SEBT. The study demonstrates that a neuromuscular-training program can increase the balance and proprioceptive capabilities of female high school basketball players and that clinical balance measures are sensitive to detect these differences. (Tamara C., McLeod V., et. al., 2009)

A similar study in female handball team, 35 players from 2 teams in the elite division participated. They had played handball for $14.9 (\pm 3.2)$ years, $4.7 (\pm 2.8)$ years at the top level. The total number of training hours per week was 10 to 11. There was a significant improvement in dynamic balance between test. The effect on dynamic balance was maintained 1 year after training. For static balance, no statistically significant changes were found. For the other variables measured, there were no statistical differences during the study period. In the Conclusion the ACL injury

prevention training program improved dynamic balance in an elite team handball player. (Holm, Inger P., et.al. 2004)

Another study examined the effects of 24 weeks of morning vs. evening same-session combined strength and endurance training on neuromuscular and endurance performance. Fifty-one men were assigned to the morning or evening training group, where S preceded E or vice versa or to the control group. Isometric force, voluntary activation, EMG and peak wattage during the maximal cycling test were measured. Training time did not significantly affect the adaptations. In the morning, no order specific gains were observed in neuromuscular performance. In the evening, the changes in isometric force and EMG were larger and in voluntary activation larger compared to controls. Peak wattage increased in the morning. Their current training program led to greater neuromuscular adaptations when SE-training was performed in the evening, whereas the ES-training provided more optimal conditions for endurance performance adaptations both in the morning and evening. (Küüsmaa-Schildt M., Eklund D., Newton R.N., et. al. 2017)

Participants included 28 healthy young women. Blood samples were collected to determine plasma levels of estradiol and progesterone immediately before the performance of the task: drop landing on a single leg from a 30-cm platform. Using ultrasonography, the distance between the tibia and the distal end of the fibula, regarded as the width of the tibiofibular syndesmosis, was measured in an upright position without flexion of the ankle. The peak ground-reaction force (GRF) on landing was measured using a force platform. The time to peak was measured as the time from initial ground contact to the peak GRF. Hip, knee, and ankle joint angles during the single-leg landing were calculated using a 3-dimensional motion analysis system. Muscle activities of the lower extremities were measured using surface electromyography. Their results were the width of the tibiofibular syndesmosis was significantly greater in the luteal phase when compared with the menstrual, follicular, and ovulation phases. Also, during the luteal phase, the Tp-GRF was significantly shorter than in the follicular phase hip internal rotation and knee valgus were significantly greater than in the menstrual phase knee flexion was significantly less than in the menstrual and follicular phases ankle dorsiflexion was significantly less than in the follicular phase ankle adduction and eversion were significantly greater than in the menstrual and follicular phases; and activation of the gluteus maximus before landing was significantly lower than in the menstrual and follicular phases. The luteal phase appears to be associated with decreased strength and laxity of the ankle as well as lower extremity muscle activity in women. The changes presumably represent a greater risk for sports injuries. (Okazaki M., Masaaki Kaneko M., et. al., 2017)

Objectives

The main aim of this study was to identify whether three neuromuscular coefficients as offered by the MGM-15 Jump Carpet relate to the average power output during jumping for female basketball players.

Subjects

The participants in this study were female basketball players (N = 20), aged from 9 to 11 years old that underwent a test using the MGM-15 carpet. The subjects participated in the ongoing national basketball league.

All the subjects were briefed beforehand regarding what the experiment consisted of and what they were required to do. The subjects were assured that any personal information would not be made public and their personal data recorded will be analysed under the cover of anonymity. Moreover, the subjects were instructed how to control social and routine aspects of their lives so that those variables would not interfere with the experiment's results. Also, after the briefing, the subjects were asked to confirm their understanding of what was required on a premade consent form.

Methods and Materials

We used the MGM-15 Jumping Carpet for test. The test consists of 15 jumps repeated 3 times: once for the left leg, once for the right one and last time on both legs. The legs must not be bent during the execution of the jumps. The software from the MGM-15 Jumping Carpet offered out, among others, four factors for each subject: average unit power (Avg_UP), structural variance coefficient (SVC), energetic variance coefficient (EVC) and force to speed asymmetry (FS_Asym). The Avg_UP is measured in watts, while the other coefficients are just a quantifiable number. The test was repeated 3 times and the average value for the two variables was recorded.

The Avg_UP is the average power developed by the subject during the jumping test.

The EVC is a coefficient that reflects the neuromuscular ability of the subject to control the technique of a movement at high speeds of repetition.

The SVC is also a neuromuscular coefficient that shows the ability of the subject to prepare for contact with a hard surface, an object or another person.

The FS_Asym reflects the difference between the ability of the subject to engage force and speed during a movement.

The protocol for the test was:

- 5 minutes explaining the test;
- 5-7 minutes' warm-up for the legs for the jumping test
- 2 minutes' preparation and getting used to the instrument;
- Calibration of the device;
- Measurement of the first set of 15 jumps on the both feet;
- 2 minutes' rest;
- Measurement of the first set of 15 jumps on the left foot;
- 2 minutes' rest;
- Measurement of the first set of 15 jumps on the right foot;
- 2 minutes' rest;
- If not valid, pause 10-15 minutes, repeat.

Results

Table 1. Correlations

		Avg_UP	CVE	CVS	FS_Asym
Avg_UP	Pearson Correlation	1	-.362	-.358	-.430
	Sig. (2-tailed)		.107	.111	.05
	N	21	21	21	21
EVC	Pearson Correlation	-.362	1	,552**	-.128
	Sig. (2-tailed)	.107		.010	.582
	N	21	21	21	21
SVC	Pearson Correlation	-.358	,552**	1	-.035
	Sig. (2-tailed)	.111	.010		.879
	N	21	21	21	21
FS_Asym	Pearson Correlation	-.430	-.128	-.035	1
	Sig. (2-tailed)	.051	.582	.879	
	N	21	21	21	21

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,625 ^a	.390	.283	.25191

Table 3. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.691	3	.230	3.629	,034 ^a
	Residual	1.079	17	.063		
	Total	1.770	20			

Table 4. Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	1.590	.137		11.607	.000
	EVC	-.022	.016	-.310	-1.353	.194
	SVC	-.016	.018	-.204	-.897	.382
	FS_Asym	-.668	.267	-.477	-2.497	.023

A linear regression statistical test was conducted to identify the relation between the jumping power output and the three other coefficients: EVC, SVC and force-speed asymmetry.

The correlation test showed that the average power output correlates with the force-speed asymmetry. Even though this is not a strong correlation it is still present. The sample size might be a reason for this low correlation.

The other two coefficients did not correlate with the average power out but they did correlate with each other. Due to this we will focus on the impact of force-speed asymmetry over the average power output.

One-point increase in the value of force-speed asymmetry corresponds to a 0.67 decrease in the average power output. Strength of the FS_Asym is almost 2 parts, even though we do not know what coefficients are responsible for the other parts.

The proportion of the three variables measured towards the average power output is 0.625 with a proportional increase of 0.390.

Conclusion

Both the structural and energetic coefficients refer to the same aspect of the neuromuscular process and therefore it was natural to identify a correlation.

The linear regression result between the power output and the force-speed asymmetry can indicate that there is an impact over the rate of variance of the asymmetry with regards to the power output. The negative value of the implication of force-speed asymmetry over the power output means that a higher power output relates to a lower force-speed asymmetry.

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Isometric Muscle Control Effect Over Movement Velocity During a Postural Balance Test

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Abstract

Background. Motor function is a neuromuscular process with high importance in human physical activity. Balance, power strength and movement speed are vital aspects of motor function that can improve physical performance. **Objective.** Our main objective was to identify the influence of isometric muscle exercise over the movement velocity during a balance test. **Subjects and Methods.** A number of 210 students from the Faculty of Physical Education and Sport, Babeş-Bolyai University, Cluj-Napoca participated in this study. We've used the AMTI Netforce for the balance test and half-squat 20 seconds for isometric exercise. **Results.** There was a significant statistical correlation between the displacement of center of pressure (COP) between the initial and final measurement. There was a significant statistical difference between the displacement of COP before and after the isometric exercise. There was no statistical difference regarding the velocity of COP before and after isometric exercise. **Conclusion.** Muscle fatigue due to isometric exercise in the half-squat stance does influence the displacement of COP but not the velocity of the COP, therefore it doesn't correlate with the body movement during a balance stance.

Keywords: balance, velocity of COP, displacement COP, isometric, muscle

Nomenclature

COP	- centre of pressure
Velocity_Ini	- value for the velocity of COP before the isometric exercises
Velocity_Final	- value for the velocity of COP after the isometric exercises
Avg_Displ_Ini	- average value for the displacement of COP before the isometric exercises
Avg_Displ_Final	- average value for the displacement of COP after the isometric exercises

Introduction

Development of motor fitness is particularly essential in professional sport, since its individual aspects or their combinations determine the skill level of athletes. Measuring motor fitness can be useful for strength, speed, and endurance sports. Different situations are observed in sports where motor coordination is more important, such as combat sports, where technical and tactical actions are often performed by athletes under conditions of extreme fatigue (creating disturbances in homeostasis). The fatigue accumulates over subsequent bouts and through incomplete recovery of energy substrates after several bouts (Stanisław et al., 2016).

Balance training is an interesting and controversial method of training for coaches because of the transversal effect that it may have on athletic performance in various sports and at different ages. From the literature, an evidence-based relationship between balance ability and the risk of injury is clear. In fact, studies have demonstrated that systematic training in a balance training program would be effective in reducing the risk of injury. (Hubscher M, et.al.,2010)

Balance can be defined as the ability to maintain the body's center of gravity over the base of support and results from neuromuscular actions in response to continuous visual, vestibular and somato-sensory feedback. In recent years, balance training has become a very popular addition to more standard athletic training programmed in many sports. Basketball, for example, requires the players to habitually address physical contact and various situations involving balance instability, such as basketball-specific accelerations and decelerations, changes in direction, penetrations into the defensive perimeter, boxing out, dribbling and defense position recovery. (Boccolini G. et.al., 2013)

Muscle strength should be distinguished from muscle power; muscle strength is defined as the force or tension that the muscle can exert against a resistance, while muscle power is defined as the speed of movement or the rate at which

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a resistance can be moved per unit of time. (Kazuhiro Kawanabe, et.al., 2007)

A study showed that players who participated in balance training for 12 weeks, compared to players who trained with isotonic machines, exhibited a significantly increase in balance and muscular power as measured through a vertical jump. In conclusion, balance training using unstable boards was an effective training method for improving balance and the vertical jump, which is a basketball-specific action that frequently occurs in this sport. (Oliver GD., Di Brezzo R., 2009).

Throwing accuracy and throwing speed were measured using Functional Throwing Performance Index (FTPI) and radar gun respectively, at zero, 12, 24 and 30 weeks in accordance with the A-B-A single-subject design. The neuromuscular training of the throwing arm was performed for 12 weeks, two days a week of supervised training including rhythmic stabilization drills were performed. A non-supervised training session including shoulder strengthening programme was conducted three days a week.

Participants demonstrated significant improvement in throwing accuracy ($p < 0.001$) and speed ($p < 0.001$) after 12 weeks of neuromuscular training. Six weeks' post-withdrawal of the neuromuscular training on throwing accuracy was not significant ($p \geq 0.117$), However, speed was sustained ($p \geq 0.013$). Neuromuscular training showed an improved efficiency in throwing performance following 12 weeks of training. The sustained effect was not observed following 6 weeks of withdrawal of training. (Hydar S.A., et.al., 2018)

In sport where throws in standing positions are allowed its necessitates that the motor fitness of athletes be tested under conditions of extreme fatigue. The grip is used to transfer forces caused by actions performed during attack or defense to an opponent's body. The specific technical and tactical actions cause the athlete to adapt individual. After repetition of movements with varied external resistance, the individual differentiation of an athlete's special motor preparation is achieved. (Sogabe A., et. al.2008)

Techniques can be performed while standing on both legs or on one leg. Several studies in sport have examined the importance of balance using a variety of research models and paradigms. Comparative research strategies are typical in the literature. Analysis of age categories found the best results in static balance in adult athletes, followed by juniors and cadets. (Sterkowicz S, et.al.2012). In another study, balance among national and international competitive-level athletes was similar to those at the regional competitive level (Paillard T, et.al 2002). Postural balance of elite athletes was superior to controls (Perrin P, et.al.2002). Balance examinations have been performed under various conditions, eyes open, eyes closed (Hrysomallis C 2011), and the results have been compared to those of untrained subjects. (Perrin P, et.al 2002).

The majority of previous studies have been conducted to analyze the effect of muscle strength on static and dynamic balance performance in populations with significant muscle weakness. These studies have utilized elderly (Carter et al., 2002), post stroke (Kligyt et al., 2003), and osteoporosis (Lord et al., 2002) subjects to determine the relationship between strength and balance but results have varied. These inconsistent findings may be a result of variations in research design including the measurement of strength and balance with different methods of assessment.

Objectives

This study aimed to identify whether or not isometric exercises influence the velocity of the COP.

As a secondary objective, we wanted to analyse whether or not the final position of COP changes after isometric exercises.

Subjects

In this study 210 subjects were involved from beginning to end. They were students from the 1st year of studies from the Faculty of Physical Education and Sport, Babes-Bolyai University in Cluj-Napoca. They were between 19 and 21 years of age and out of them there were 57 females and 153 males.

All the subjects were briefed beforehand regarding what the experiment consisted of and what they were required to do. The subjects were assured that any personal information would not be made public and their personal data recorded will be analysed under the cover of anonymity. Moreover, the subjects were instructed how to control social and routine aspects of their lives so that those variables would not interfere with the experiment's results. Also, after the briefing, the subjects were asked to confirm their understanding of what was required on a premade consent form.

Methods and Materials

Our study consisted of two main parts: the initial test and the final test. Both tests consisted of balance tests. The final test had, besides the balance test, isometric exercises that were done before each measurement.

The balance test was done using the AMTI NETforce platform BP400600. It is a force platform that measures the pressure force of the subject. Because of this it has the ability to register any variations or modifications regarding the

centre of pressure (COP), and, at its core, the movement of body's centre of gravity. After the test, the platform's software allows us to visualize two parameters, among others: velocity and displacement of the COP.

Displacement is the straight-line distance from the starting position to the final one at the end of the test. Not to be confused with the trajectory.

Velocity is an average speed of movement for the COP during the test.

The isometric effort consisted of three exercises: one for the upper body, one for the core and one for lower body. For the first one the subject was required to hold a half push-up stance for 20 seconds, for the second one a 30 second plank and for the final one a 30 second half-squat.

We measured, for each of the two balance tests, one postural stance: the standing position – feet shoulder width apart, body straight, arms to the sides of the body and the head straight.

The protocol for the two tests was:

- 3 - 5 minutes explaining the test;
- 2 minutes' preparation and getting used to the instrument;
- Calibration of the device;
- Measurement of the standing position;
- Pause 10-15 seconds, and if not valid, repeat.

For the statistical analysis of the data we've used the SPSS v17.0 version of the software. A paired sample t-test was conducted for each balance parameter between the initial and final measurements.

Results

Tabel 1. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Avg_Displ_Ini	.7145	210	.35642	.02460
	Avg_Displ_Final	.7985	210	.38775	.02676
Pair 2	Velocity_Ini	3.5214	210	3.70768	.25585
	Velocity_Final	4.0250	210	1.33117	.09186

Tabel 2. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Avg_Displ_Ini & Avg_Displ_Final	210	.000	.997
Pair 2	Velocity_Ini & Velocity_Final	210	.038	.588

Tabel 3. Paired Samples Test

		t	df	Sig. (2-tailed)
Pair 1	Avg_Displ_Ini - Avg_Displ_Final	-2.310	209	.022
Pair 2	Velocity_Ini - Velocity_Final	-1.875	209	.062

A paired-sampled t-test was conducted to compare the value of the initial average displacement before isometric exercises (Avg_Displ_Ini) and the value of the final average displacement after the isometric exercises (Avg_Displ_Final) for the subjects. There was a significant difference in the scores of the initial test (M= 0.71451, SD= 0.356418) and of the final test (M= 0.79849, SD= 0.387749) conditions; $t(209) = -2.31$, $p = 0.022$. These results suggest that the isometric effort the subjects undergone did affect the displacement of COP during the standing stance.

A paired-sampled t-test was conducted to compare the value of the initial velocity before the isometric exercises (Velocity_Ini) and the value of the final velocity after the isometric exercises (Velocity_Final) for the subjects. There was no significant difference in the scores of the initial test ($M= 3.52136$, $SD= 3.707682$) and of the final test ($M= 4.02504$, $SD= 1.331167$) conditions; $t(209)= -1.875$, $p = 0.062$. These results suggest that the isometric effort the subjects undergone did not affect the velocity of COP during the standing stance though the values are close to a significant level.

Conclusion

The study of balance stances and their impact over physical activity should be conducted often to identify the level of influence balance has over physical fitness development. A poor balance may lead to faulty execution of a movement and thus it may affect its result.

Our study concluded that there was a significant difference between the displacement values of COP before and after the isometric effort. This means that the exercises the subjects did impacted the final position of COP at the end of the test. The fact that isometric effort influences the final position of COP means that, after such exercises, the subject can't control the place where his body ends the movement. This may indicate that there will be a translation of the postural vertical line over the course of the technique that may have negative effect on its efficiency.

There were no other significant differences between the initial and final values of the velocity of COP. Even though the statistical result was close to being significant our conclusion is that isometric exercises do not influence the speed of movement for COP. We do suggest that a larger sample should be used for further studies and a more detailed analysis of the measurement protocol should be conducted to focus on evaluating the velocity aspect of balance.

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Study on the Efficiency of Using the Butterfly Robot in Developing the Specific Motor and Technical Qualities of Table Tennis

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Abstract

Table tennis is what is called a sport "for all", demanding efforts accessible to everyone, which can be practiced by all categories of people: women, men, young people, elderly people, people with disabilities, etc.

This sports discipline is a part of the educational offer of the Department of Physical Education and Sport, University of Bucharest, since its foundation, being among the five most frequented sports activities by the students of this institution every year.

The content of physical education lessons (table tennis) refers to both the technical and the physical training specific to this sport, adapted to the physical and psychological particularities specific to the age of young students.

The recognized forms of practice in the physical education lessons are, depending on the objectives pursued, the global practice, the exercise in pairs, the practice with the teacher. In a table tennis lesson, these forms of exercise could lead to a reduced motor density due to the "dead times" needed to gather the balls out of the game.

Thus, in order to increase the intensity of the training, the modern methodology implies the use of the means and the facilities that will lead to the efficiency of the training process. Such a device is the table tennis robot, which can throw balls at an adjustable frequency in one place or with the permanent change of direction, with a desired trajectory, with or without effect, at an adjustable speed according to what we propose.

What specially increases the intensity of training with this device is the frequency of shots that can go beyond the usual gaming, reaching even 100 shots per minute.

Therefore, we aim to demonstrate in the present paper the efficiency of using such a device in developing the motor and the technical qualities specific to table tennis, in a physical education lesson with students.

The subject of our research were 20 students (16 boys and 4 girls) of various faculties of the University of Bucharest, divided into two groups: the control and the experimental groups. In our approach, we used the following methods: the bibliographic method, the observation, the experiment, the statistical mathematical method, the test method.

The analysis of the results of the two groups as well as the value of the calculated statistical indicators confirms the proposed hypothesis, namely the improvement of the motor and technical qualities specific to table tennis by the use of modern training devices.

Keywords: table tennis; Butterfly Robot; students;

Introduction

Together with the other sports disciplines in the educational offer of the Department of Physical Education and Sport, also through table tennis contents, we aim to achieve the general objectives of the physical education: the harmonious physical development, the optimization of health, the development of motor capacity, etc., but also some specific objectives that target technical, tactical, physical, theoretical and psychological aspects.

The status of the physical education discipline within the faculties of the University of Bucharest ranges from "compulsory" to "optional", so that students' choice for a particular sport discipline (in the present case - table tennis) is based on a different motivation, so it can be the passion for the respective sport, the desire for physical and technical improvement or only the obligation to access one of the sports activities included in the program.

In this context, it goes without saying that the participating groups are quite heterogeneous, both technically and physically, which makes it quite difficult for us to fulfil our general or specific objectives.

Despite all the difficulties, we have always been concerned with finding the most effective means and methods, the most appropriate forms of practice: the global practice, the practice in pairs, the practice with the teacher, even though the motor density for these well-established forms of practice is diminished due to the "dead times" needed to gather the balls out of the game.

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Thus, in the context of modernizing the technology used in training, we have been using a highly efficient installation to increase the intensity of the table tennis training - the Butterfly Robot (fig. 1), which can throw balls at an adjustable frequency in one place or with a permanent change of direction, with a desired trajectory, with or without effect, with an adjustable speed depending on what we are aiming for. This was possible thanks to the support of some coaches from The Sport Association O.K. Bucharest who borrowed us the Butterfly Amicus Professional robot during the experiment.



Fig. 1 – The Butterfly Amicus Professional Robot

The purpose of the paper

We aim at demonstrating in the present paper the efficiency of using such a device in developing the motor and technical qualities of table tennis, in a lesson of physical education with students.

The research methodology

The premises of the research

Table tennis has evolved much in the recent years, in all aspects: the technology of used materials, the technique, the tactics, the physical training, the regulation.

There is a strong relationship of determination between the technology of the used materials (paddle, ball, playing surface) and the technique, in the sense that the improvement of the used materials leads to a proper adaptation of the technique and the tactics.

The research hypothesis

In our experiment, we have proposed to verify the following hypothesis: the use of the Butterfly robot in the training process will lead to a superior manifestation of the resistance in speed mode, which will also be reflected in the execution of the technical tactical procedures.

1.1. The sample of the research and the venue

The experiment was carried out in the gym of the Faculty of Foreign Languages, having 5 tables, 200 balls and the Butterfly Amicus Professional robot.

The subjects of the research (16 boys and 4 girls, aged 19-21 years old), second year students from various faculties of the University of Bucharest, were divided into two groups: the control group, 10 students whose training aiming at the development of resistance in speed mode was made by classical practice, by practicing the themes in pairs or with the teacher and the experimental group consisting of 10 students who benefited by the robot to practice the training themes.

The research methods

In our approach, we used the following research methods: the bibliographic method, the observation, the experiment, the statistical mathematical method, the test method.

Methods

The research stages

Our experimental approach took place in the second semester of the academic year 2017-2018, taking several stages:

- choosing the control and the experimental groups;
- establishing the exercises and the tests;
- the initial test application (February 2018);
- establishing the methods used in the experiment;
- developing and applying the structures designed to develop the resistance in speed mode within the training plan;
- performing the final test (May 2018);
- data processing and interpretation.

We mention that the both groups received two training sessions per week with a duration of 90 minutes, the main theme being 40 minutes, the technical and physical level of the subjects in the two groups being similar at the beginning of the experiment (according to the results of the initial test).

Specific training exercises (examples)

Forehand drive 2-2 (2 forehand, 2 backhand) at the robot, at a frequency of 70 balls / minute, 3 series of 2.30 minutes, 1 minute break between the series;

Forehand drive 1-1 (1 forehand, 1 backhand) from the backhand corner of the robot, at a frequency of 70 balls / minute, 3 series of 2.30 minutes, 1 minute break between the series;

B-M-B-F drives (backhand – middle – backhand - forehand) at the robot, at a frequency of 70 balls / minute, 3 series of 2.30 minutes, 1 minute break between the series;

Forehand and backhand drive 3-2-2-1 (3 forehand, 2 backhand 2 forehand 1 backhand) at the robot, at a frequency of 70 balls / minute, 3 series of 2.30 minutes, 1 minute break between the series;

Forehand and backhand drive 1-1-2-2-3-3 (1 forehand, 1 backhand 2 forehand 2 backhand 3 forehand 3 backhand) at the robot, at a frequency of 70 balls / minute, 3 series of 2.30 minutes, 1 minute break between the series;

Forehand and backhand free drive, at the robot, at a frequency of 70 balls / minute, 3 series of 2.30 minutes, 1 minute break between the series;

Side movements, from forehand to backhand, with the imitation of strokes, backward 3 steps to the middle of the table and return to forehand, the center of gravity being as low as possible.

Movements towards the net, starting from the base position, imitating forehand and backhand topspin strike.

There are performed 10 movements at maximum rhythm, 3 series with a 15 seconds break between repetitions and 1 minute between the series.

Assesment tests

T1: One point Forehand drive at the robot directed in 3 points, for 1 minute with a frequency of 70 balls / minute.

T2: One point backhand drive at the robot directed in 3 points, for 1 minute with a frequency of 70 balls / minute.

T3: Forehand and backhand drives at the robot, for 1 minute with a frequency of 70 balls / minute.

T4: Forehand drives from 3 points (forehand corner, middle, backhand corner) at the robot, for 1 minute with a frequency of 70 balls / minute.

T5: Specific side movements over a distance of 3 m, for 1 minute.

The balls sent by the subjects on the other half of the table, including those that touched the net or the edge of the table, were considered valid.

Results

The comparison of the results of the two groups in the initial and the final testing reveals progress, but for the experimental group this is much more consistent and the statistical indicators calculated confirm their statistical representativeness.

In table no. 1 are presented the results obtained by the subjects of the experimental group at the 5 assessment tests, the initial and the final testing.

Table 1. The results of the experimental group, initial and final testing

Subjects	T1		T2		T3		T4		T5	
	T.I.	T.F.	T.I.	T.F.	T.I.	T.F.	T.I.	T.F.	T.I.	T.F.
S1	66	70	66	69	63	67	62	66	73	76
S2	60	65	63	67	62	67	60	64	71	73
S3	66	70	67	70	66	69	64	68	80	84
S4	65	69	65	70	64	69	64	68	67	70
S5	63	68	66	69	63	67	62	66	70	73
S6	66	70	66	69	63	67	62	66	80	86
S7	60	65	63	67	62	67	60	64	82	88
S8	66	70	67	70	66	69	64	68	81	89
S9	65	69	65	70	64	69	64	68	81	90
S10	63	68	66	69	63	67	62	66	86	86
Average	64	68.4	65.4	69	63.6	67.8	62.4	66.4	77.1	81.5

Thus, in the case of the experimental group, we distinguish the differences between the averages recorded in the final testing compared to the initial testing as a result of our training program, these results being supported also by the statistical analysis which showed a significant difference.

The recording of the results obtained in the final testing by the subjects of the two groups is presented in table no. 2, as follows:

Table 2 –The comparative results obtained by the two groups, final testing

Assessment Tests	Statistical indicators (n=10)			
	$\bar{X} \pm m$			
	Final Testing		t	p
	Control group	Experimental Group		
Test no.1 (shots)	65.8±2.4	68.4±3.8	7.64	0,00
Test no.2 (shots)	65.4±2.4	69±1.3	7.94	0,00
Test no.3 (shots)	63.6±2.0	67.8±1.0	10.8	0,00
Test no.4 (shots)	63.2±5.9	66.4±2.4	3.63	0,005
Test no.5 (meters)	78±39.1	81.5±58.2	5.65	0,0003

Comparing the results obtained in the final testing by the subjects of the two groups, we can notice the large differences between the media, both in the first 4 technical tests (robot shots) and in the fifth physical test (specific lateral movement), and the t values shown in Table 2, at a significance threshold <0.05, show that these differences are statistically representative. This confirms that the use of the robot in the training of the experimental group has been extremely effective in developing the resistance in speed mode, expressed both technically and physically.

The mean values recorded by the two groups are presented graphically in figure no.2.

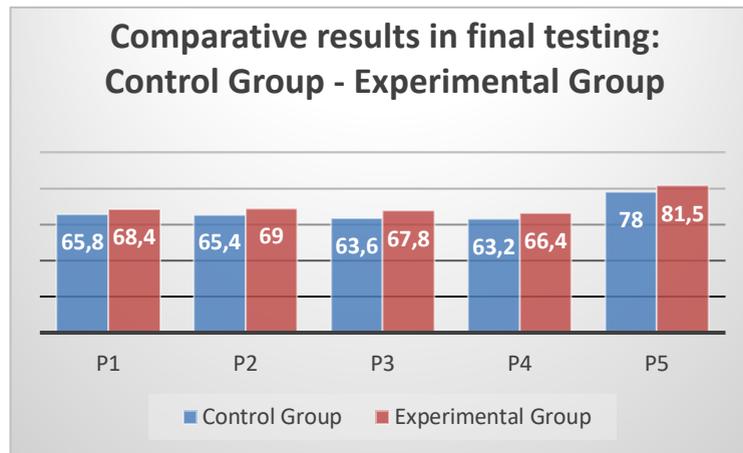


Fig. 2 – The mean values of the two groups, final testing

Conclusions

The analysis of the results of the two groups as well as the value of the calculated statistical indicators confirms the proposed hypothesis, namely the improvement of the motor and technical qualities specific to table tennis by the use of modern training devices.

The resistance in speed mode is an extremely important motor quality in table tennis, both at the technical and physical level. Our experiment has shown that the use of the Butterfly robot can contribute both technically and physically to the development of this motor quality compared to classical training in pairs or with the teacher.

The purchase of such a device for the table tennis lessons conducted during the physical education course could lead both to the efficiency of the instructive educational process and to the increase of the attractiveness of the lessons.

The small number of the subjects could be considered a limit of our research which prevents us from extrapolating the results of our approach.

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Recovery of Hemiplegy Using Physiotherapy Means

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Abstract

Physical therapy is the basic treatment of hemiplegic recovery in order to obtain self-care, autonomy of movement and, last but not least, socio-professional insertion. It has been found that in 5% of cases a spontaneous improvement takes place, and 80% of the patients can have progress in several weeks of kinetotherapy with obvious progress, which may end up with regaining autonomy. We believe that by regularly practicing kinetic treatment including methods, techniques, and physical therapy exercises, we will increase the quality of life of the patient by improving walking and self-service for socio-professional insertion. In order to carry out the research, we selected two lots, one that did not benefited from pshysical therapy and 1 that did benefited from physical therapy treatment during February - June 2018. The evaluation methods used and the initial values obtained (25.02.2018) for the two lots: Barthel Index, FID Scale, Tinetti Scale for Walking, Tinetti Scale for Balance. The use of kinetic means (massage, postures, active, passive and active - passive mobilizations, techniques and methods of neuroproprieceptive facilitation, dynamic exercises, breathing exercises and relaxation) led to both the achievement of both the objectives of the cold - healing program and the research goal. Results and discussions: Lot no. 1 (10 pacients without physical therapy) and lot no. 2 (10 pacients with physical therapy). Lot no.2 recorded initial improvements to both the Tinetti Balance Test and Tinetti Scale for Walking. On the FID scale and the Barthel Index the second lot recorded increased values for daily activities. Physical therapy is used in all stages of hemiplegia, focusing on the quality of life of each patient for their reintegration into the family, society and, if possible, on the professional line, at their old workplace or with a professional retraining suitable for each patient.

Keywords: post AVC, recovery, quality of life

Introduction

Stroke is one of the leading death and disability causes in adults worldwide. In the world, every year, 15 million people are affected by Stroke, six million of them die. Stroke is the second leading cause of death worldwide and the third leading cause of death in the G8 countries, preceded only by heart disease and cancer. Romania is amongst the first ten European countries regarding the incidence of stroke, with approximately 200 strokes/100000 inhabitants (Mureșanu, 2013).

The stroke is the appearance of a more or less rapid decrease of brain function following the alteration of the blood circulation in the brain. This can be characterized as obstruction of a cerebral artery, such as hemorrhage, or as a temporary decrease in blood flow. (Tripovic' et al., 2014)

According to statistics, almost 50% of the patients with stroke have difficulties in performing tasks of daily living, hence the importance of functional rehabilitation. (Cordun, Marinescu, 2014)

Motor ability is a complex reaction to the environmental stimuli including, in a characteristic unit, several elements: psychomotor skills, as a natural psychophysical endowment an the motor-athletic skills, influenced by a multi-level maturity of the functions and by practice, and accompanied by internal motivational factors. (Abalașei, 2012).

The physical affectation forces them to create a new body image of themselves, which is considered to be a stressful factor, joined to a low perception of their self-esteem, this may reduce their functioning in the Activities of Daily Living (ADL) and therefore in their occupation and perception of quality of live (Castellanos et al., 2012; Braniste, Arsenescu-Georgescu, Braniste, Dorgan, 2018).

Physical therapy is the basic treatment of hemiplegic recovery in order to obtain self-care, autonomy of movement and, last but not least, socio-professional insertion.

It has been found that in 5% of cases a spontaneous improvement takes place, and 80% of the patients can have progress in several weeks of physical therapy with obvious progress, which may end up with regaining autonomy. If

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work is done day by day in the first year, it recovers the most, and in the second year the progress is less obvious and then the recovery will continue to maintain or even improve what has been won. (Engrich, 2011)

Rehabilitation programs for hemiplegic stroke patients often consist of training aimed at improving the patient's activities of daily living (ADL) and their ability to walk, which affect the patient's daily life, including the outcomes after hospital discharge (Shinohara et al., 2011; Mauritz, 2002, Teasell et al., 2003)

Gait is an important factor for reinserting the hemiplegic in the society; such reinsertion is far from easy and it cannot be accomplished directly; it requires a family stage, in its turn conditioned by the patient's state. It may be attained if he is autonomous enough, if his mental state does not make him prone to a catastrophe when left alone, if the family has a free caregiver to take him over, to help him, and to improve the rehabilitation level achieved up to that moment (Lucaci, Neculaes, 2015).

The rehabilitation programs of patients with an ischaemic stroke comprise a set of means and methods assisting their physical and medical recovery. It is recommended for the physical therapy programs to be implemented early and to take into account the particularities of each patient. Most disabilities caused by a stroke are recovered within around six months, but some sequelae may be irreversible (Lucaci et al., 2018).

Best practice in stroke rehabilitation involves specialized inter-disciplinary teams working (Edmans, 2010) in a highly coordinated manner to obtain best outcomes, stroke rehabilitation being most effective for moderately severe stroke patients.

OT is part of the multidisciplinary rehabilitation after stroke and functions in collaboration with the other involved healthcare professions (Steultjens et al., 2003).

The purposes of intervention in elderly with stroke focus on: amelioration of participation in meaningful everyday roles, tasks, reducing of deficits impact, avoiding secondary complications and providing professional education and support to the patient and therapeutic team (Rowland et al., 2008).

Hypothesis

We believe that by regularly practicing kinetic treatment including methods, techniques, and physical therapy exercises, we will increase the quality of life of the patient by improving walking and self-service for socio-professional insertion.

Material and methods

In order to carry out the research, we selected two cases that benefited from recuperatory treatment during February - September 2018.

Patients in both group 1 and group 2 suffered an ischemic stroke in 2018 affecting the entire Sylvian territory of the brain. As a result of this unfortunate accident, a motor deficit on the right side (hemiplegia) has occurred which has led to significant impairments in self-service capacity and autonomy of movement, thus depending on family help to perform the most common tasks.

Lot 1 - Patients are hospitalized for clinico-paraclinical re-evaluation and initiation of rehabilitation treatment of an installed motor deficit in September 2018.

Ex. Neurologically: possible only with unilateral support, spastic right, right limbs motor deficit, right pyramidal hypertonia, ROT M.S. present dr.> stg., disorders of the body schema - asomatognosis dr, trophic disorders M.S dr.

Anamnesis Lot 2-Known as a major vascular pathology (HTA Grade III, CIC, Ap - Unstable) presents on 18 September 2016 a motor deficit of the right limbs.

Cranio-cerebral CT scan: revealed left sylvian infarction.

Ex. Neurological: possible with unilateral, spastic support on the right; motor deficit; ROT superior and inferior living two legs; Marinescu Radovici bilateral reflex, Achilles clonus dr. right facial paresis.

The evaluation methods used and the initial values obtained (25.02.2018) for the two lots: Barthel Index, FID Scale, Tinetti Scale for Walking, Tinetti Scale for Balance.

Barthel Index - Records 10 activities with scores between 0 (total dependency) and 15 (total independence). It has a very good validity and reproducibility and its sensitivity can be increased by introducing new categories and functions.

The Barthel test can have a total score of 0 to 100 points. The higher the score, the better the patient's functional condition. (Sirbu, 2008)

The FID Scale - presents 18 elements of appreciation (categories and functions) of which 13 are movement and 5 are cognitive elements. The 18 elements are divided into 6 groups.

Next to the score on each item is the figure of the appropriate. It is obvious that the higher the scores the better the individual is without the dysfunctional phenomena.

The maximum score for the FID Scale is 126 points. (Sbenghe, 2002)

The Tinetti Balance Test - includes the actions: unsupported, raised from sitting, sitting from orthostatism, unsupported orthostatism, blinded eyes, 360 degree return, imbalance, which they appreciate according to the success of the action with 2 (0 and 1) or 3 degrees of appreciation (0, 1 and 2). The patient is seated on a safe chair without a backrest. From this position the tests are initiated.

- 0 - incapable of moving
 - 1 - capable of moving
- or
- 0 - incapable of moving;
 - 1 - able to perform the movement with difficulty
 - 2 - capable of moving without difficulty

Tinetti Walking Test - is an analysis of the most important components of the walking scheme that runs at a pace corresponding to the subject (step initiation, step length, step height and symmetry, step continuity, deviation of walking path, distance between the heel in walking, trunk movement). Quotations used for the activities are similar to the Tinetti Balance Test. (Marcu, Matei, 2009).

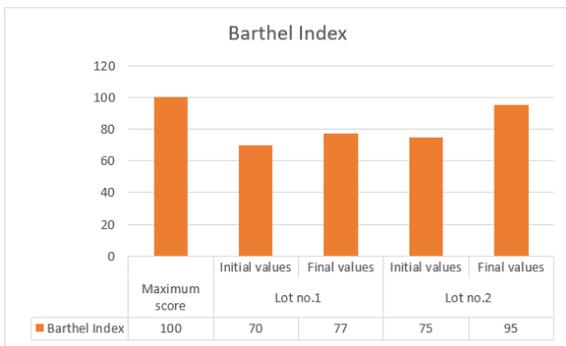


Figure no.1 Results at Barthel Index



Figure no.2 Results at FID Scale

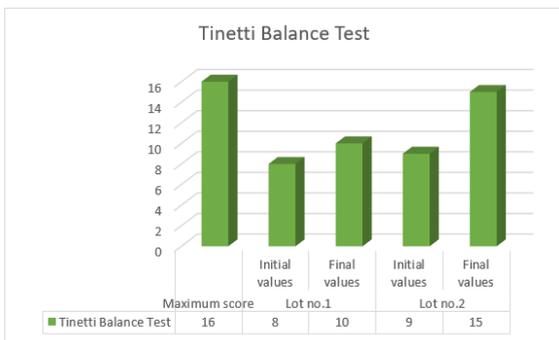


Figure no.1 Results at Tinetti Balance Test

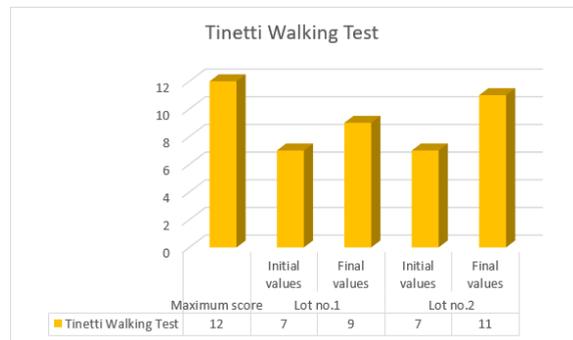


Figure no.1 Results at Tinetti Walking Test

After using the kinetic means (massage, postures, active mobilizations, passive and active - passive techniques and methods of neuroproprioceptive facilitation, dynamic exercises, breathing exercises and relaxation), they ultimately led to the fulfillment of both the objectives of the cold - healing program and the research purpose.

At the Lot no. 2, we have noticed during the second and third months of research that the uncoordinated without fluency and balance of the 10 patients has "undergone" improvements towards a closer approach to the normal one. Similarly to the upper limb (where improvements are less obvious to the inferior limb due to the much larger cortical area they occupy and the more severe spasticity of the flexors), two patients can still use the plexus hand at the hand stage pillar to the digital hand. thus increasing the degree of self-service and independence of the patient.

At lot no. 2, we have noticed the importance of the physical therapy program. The patients have gained after 5 month similar results, very closer to the first ones.

Conclusions

Best practice in stroke rehabilitation involves specialized inter-disciplinary teams working (Edmans, 2010) in a highly coordinated manner to obtain best outcomes, stroke rehabilitation being most effective for moderately severe stroke patients. (Ciucurel, Iconaru, 2012)

Physical therapy is used in all stages of hemiplegia, focusing on the quality of life of each patient for their reintegration into the family, society and, if possible, on the professional line, at their old workplace or with a professional retraining suitable for each patient.

In other words, daily physiotherapy performed with the recovery team proved to be effective in the two patients selected for research.

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Correlation Between the Results Obtained in the Ruffier Test, the VO₂max Level and the Anthropometric Measurements Regarding Weight, Fat Excess and Lean Mass Deficit in Soccer Players

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Abstract

The anthropometric measurements and the results recorded by athletes – amateurs or professional – in some effort tests may represent, for coaches, reference points concerning their physical state and training level. This research has the purpose of identifying correlations between the results obtained in the Ruffier test, the VO₂max level and the anthropometric measurements regarding weight, fat excess and lean mass deficit in soccer players. 28 athletes, seniors, amateur soccer players, were measured and tested. The study concluded the existence of correlations between the results at the Ruffier test and the anthropometric indicators directly related to bodyweight only for FE and OW, and that there are correlations between RI and LMD. In addition, the results indicate a strong correlation between RI and the VO₂max level.

Keywords: correlation, Ruffier, anthropometric indicators, VO₂max.

Introduction

Human constitution is a complex of individual physiological and anatomical features of the human body formed based on the acquired hereditary properties, under the influence of several factors, the priority ones being related to nutrition and the practice of physical exercises. Sports fitness – in case of those who practice physical exercises or a certain sport – is provided by a multitude of factors with direct involvement in the body's adaptation to a training program (Drăgan, 2002). The present study is interested in the possible correlation between several usual anthropometric measurements of the athletes such as optimal weight (OW), lean mass deficit (LMD), fat excess (FE) and the results of two effort tests targeting cardiovascular adaptation to effort, the Ruffier test and Astrand Ryhming. Many authors have integrated the aforementioned factors in the concept of fitness. Ratamess (2012) includes in general fitness the components related to the physical health of the body, while fitness specific to the components necessary to perform in different physical activities. Specific fitness, according to Plowman & Smith (2002), focuses on optimizing athletic performances, being the concept of treatment assuming a scheduling and planning of the methods and means within a methodical process.

The study of body in effort provides additional information and underscores – compared to the situation at rest – functional modifications that were not identified at rest and it allows the differentiation of the subjects concerning the functional loading degree of the apparatuses and systems involved in ensuring the adaptation to effort. In conditions of physical effort, all the apparatuses and systems are loaded, but the intervention of the cardiovascular apparatus dominates. A variable of interest in our study is the level of physical condition through the reactivity of the heart to effort, obtained using *the Ruffier test*. The weight of an individual is provided by lean mass (the active tissue that is represented for the most part by the muscle mass, but also by bones, ligaments, tendons, blood, organs) and passive mass (body fat). The anthropometric parameters necessary to assess the nutritional status determined by somatometry are: height (cm), weight (kg) and the determination of body composition.

Height is genetically conditioned and is influenced, like the other anthropometric parameters of nutritional factors, environmental factors and the practice of physical exercises (Drosescu, 2004). Generally, height characterizes quite well an individual's development and all the other anthropometric measurements can relate to this size (Neagu, 2014).

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Bodyweight represents the sum of variable elements of each a part that is relatively fixed (weight of the skeleton, of the nervous system, of the skin and the viscera) and a very variable part (muscles, fat and infiltration water within the tissue) (Urichianu, 2010). The relative proportions of fat and muscles may vary very much (Drăgan, 2002). Normally, the fat tissue must account for around 10-18% from the total bodyweight, in men, and between 18-25% in women. What exceeds these limits is called overweight, even if the weight per se may be in normal limits (Mocanu, 2009). This aspect is sometimes encountered in amateur athletes, including in soccer players. In other words, whereas the weight in kg is normal, yet the fat percentage contributing to these kilograms may be too high. On the other hand, the reverse situation is also possible: excess weight in kg may be possible without the fat percentage exceeding the normal limits. This may be encountered in athletes with big lean mass. Any excess fat is harmful, and exceeding the ideal weight by more than 20% may put the body at serious health risks. Optimal or so-called ideal weight is always expressed depending on sex and height.

Body composition highlights the fat tissue and the lean mass and it is determined by measuring the body fat folds using the adipose tissue centimetres, using the calculation formula of the National Institute of Sports Medicine Bucharest. For the calculation, we use the Dubois-Raymond nomogram to determine the body surface (Neagu, 2014). This investigation allows the appreciation of fat excess (FE) or of lean mass deficit (LMD) for each individual, for the respective height and age. In mass and/or performance sport, we are interested in both components: lean mass and the fat tissue. Lean mass is the one finalizing the effort, being correlated with the dynamic force stored on cm² of muscle surface. The increase in lean mass must be reflected in the increase of strength and thus in the increase of sports productivity. An athlete with a better lean mass may support a high percentage of subcutaneous body fat, but this increase must not be exaggerated. The excess body fat may affect seriously health and sports performance. The alterations of weight and of body composition in athletes correlates with the state of practice, the period of training and the energetic input (Drăgan, 2002). Some studies have shown that the percentage of body fat is inversely proportional with the aerobic power and with performance in long-distance runs, and the level of lean mass correlates with performance in sports where maximum strength is necessary (Hosick, 2018).

Hypothesis and research methodology

The hypothesis from which we started was the following: there are correlations between the results at the Ruffier test, the VO₂max level and the anthropometric indicators directly related to bodyweight, FE, OW and LMD.

In other words, the study aims to identify correlations and establish which of these anthropometric indicators may be correlated with the level of cardiac reactivity to moderate effort (RI – Ruffier index).

The subjects of the research are 28 young people aged between 18 and 25, amateur athletes who practice soccer in a team part of the D division in the county of Iași.

The research was conducted in Iași, during the competitive year 2017-2018. The data were recorded after the athletes had their medical check-up to obtain the clearance for physical effort, which is mandatory for participating in a competition. The specialized medical practitioners conducted measurements and tests at the Clinic for athletes within the Nicolina II Hospital. The functional evaluation of the cardiovascular apparatus in effort was assessed using the Ruffier cardiac resistance index. *The objective* of this test consists of appraising exercise capacity through the modifications of heart rate during the period of post-effort recovery, thus determining heart reactivity to moderate effort. *The method principle* – is based on the reaction of heart rate to standard, minor effort (30 squats). By applying a calculation formula, we obtained an index that may be traced in dynamic. *The working technique* – the subject sits. Heart rate is measured for 15 seconds until the values stabilize. As follows, the subject executes 30 squats in 45 seconds (frequency of 90 on the metrometer, one beat for each time of squats – up-down). Immediately after finishing squats, the subject sits and heart rate is measured for 15 seconds, between the second 0-15 and 45-60 of the first post-effort minute. The three values are introduced in the calculation formula of the RUFFIER index: $(P1 + P2 + P3) - 200 / 10$. *Interpretation* – done depending on the values of the RUFFIER index (RI) calculated using the aforementioned formula and depending on the relations between the three values of the pulse. The test proposed by Ruffier provides information on cardiac response to moderate, standard, non-specific effort. The comparison of results at the Ruffier test allows, according to some authors, the appraisal of momentary physical condition of a subject. We measured and calculated OW, FE and LMD according to the DUBOIS nomogram, in order to determine body surface. We measured VO₂max by conducting the Astrand-Ryhming test.

Results and discussions

In the Table below (*Table 1*), the results recorded after the evaluations and measurements are centralized:

Table 1 – centralized values recorded for RI, VO₂max, FE, LMD and OW

No.	Name	Height (cm)	Weight (kg)	OW (kg)	FE (kg)	LMD (kg)	VO ₂ max (ml ⁻¹ Kg ⁻¹)	Ruffier RI
1	C.C.	184	84	79	3	+2	62 (b)	3
2	A.L.	182	70	70	0	0	63 (b)	3
3	B.A.	181	71	71	0	0	41 (fs)	15
4	A.A.	172	63	63	-1	+1	70 (b)	1
5	C.S.	176	62	64	0	2	55 (m)	8
6	V.C.	180	84	78	5	+1	44 (m)	11
7	S.B.	177	74	68	3	+3	60 (b)	4
8	P.G.	185	77	77	2	2	51.9 (m)	12
9	P.D.C.	175	71	71	-2	+2	62 (b)	3
10	C.B.	183	86	80	6	0	46 (m)	14
11	G.R.	176	67	67	0	0	65 (b)	2
12	T.C.	184	69	70	-1	0	53 (m)	9
13	D.B.	193	93	88	5	0	47 (m)	13
14	B.M.	181	62	65	-1	2	71 (fb)	1
15	C.S.	173	68	68	1	1	58 (m)	5
16	D.L.	173	68	68	1	1	54 (m)	7
17	D.A.	176	76	76	0	0	63 (b)	3
18	C.D.	172	72	69	2	+1	61 (b)	4
19	C.R.	166	60	60	0	0	56.6 (m)	9
20	G.I.	177	70	70	0	0	54.7	12
21	B.A.	183	70	70	-1	+1	68.5 (b)	1
22	C.P.O.	168	61	60	1	0	72 (fb)	0
23	P.B.	175	82	77	5	0	48.7 (m)	14
24	P.S.A.	183	73	73	2	2	50.6 (m)	12
25	N.I.	173	65	65	0	0	52 (m)	13
26	P.D.	182	76	72	3	+1	48.6 (m)	12
27	A.I.	178	75	70	5	0	49.3 (m)	10
28	R.A.	187	91	85	7	1	44 (m)	16

The following Table (Table 2) features the centralized statistical values calculated for height, weight, OW, FE, LMD, VO₂max and RI. The minimum and maximum values may be used to calculate amplitude one each indicator assessed. Because the study had just one group, this amplitude may only be compared with the findings reported by other studies. Thus, Honceriu (2015) featured an average of VO₂max of 55.28 ml⁻¹kg⁻¹ with amplitude of 28, which are similar to those within our study, namely VO₂max of 56.14 ml⁻¹kg⁻¹ and amplitude of 31. It is worth stating that both studies used the same type of VO₂max assessment (Astrand test). Another study (Sticea, 2016) indicates a variation coefficient of 61 % for the Ruffier test in a group a students.

Concerning the variation coefficient, it allows the comparison between statistical series in terms of standard deviation. A lower variation coefficient indicates a better grouping around the average value. The variation coefficient differs from one measurement to another, but the homogeneity of the collective on the measurements was rather low, which is illustrated in the Table below. The same study indicates a standard deviation of 3.94 for the results at the Ruffier test, compared to 5.09 in our study.

Table 2 – Centralized statistical values calculated for height, weight, OW, FE, LMD, VO₂max and RI

	Height (cm)	Weight (kg)	OW (kg)	FE (kg)	LMD (kg)	VO ₂ max (ml ⁻¹ kg ⁻¹)	Ruffier RI
Number of values	28	28	28	28	28	28	28
Minimum	166.0	60.00	60.00	-2.000	0.0	41.00	0.0
Maximum	193.0	93.00	88.00	7.000	3.000	72.00	16.00
Mean	178.4	72.86	71.21	1.607	0.8214	56.14	7.750
Std. Deviation	6.008	8.843	6.828	2.455	0.9049	8.715	5.096
Std. Error of Mean	1.135	1.671	1.290	0.4639	0.1710	1.647	0.9631
Lower 95% CI of mean	176.1	69.43	68.57	0.6553	0.4706	52.76	5.774
Upper 95% CI of mean	180.7	76.29	73.86	2.559	1.172	59.52	9.726
Coefficient of variation	3.37%	12.14%	9.59%	152.73%	110.16%	15.52%	65.76%

The following Table (Table 3) features centralized statistical data regarding the correlation between FE, LMD, OW, VO₂max and RI.

Hence, it may be stated that there is a statistically significant correlation between the results in the Ruffier test and FE, OW and VO₂max. The strongest correlation in case of our study is determined between RI and VO₂max. In addition, the study shows that there is no significant correlation between RI and LMD.

Table 3 – Centralized statistical data for the correlation between FE, LMD, OW, VO₂max and RI

	Ruffier vs. OW (kg)	RI Ruffier vs. FE (kg)	RI Ruffier vs. LMD (kg)	RI Ruffier vs. VO ₂ max(ml/gk/min)	RI
Pearson r					
r	0.5178	0.5751	-0.2510	-0.9467	
95% confidence interval	0.1793 to 0.7467	0.2571 to 0.7807	-0.5707 to 0.1348	-0.9753 to -0.8868	
R square	0.2681	0.3308	0.06299	0.8962	
P value					
P (two-tailed)	0.0048	0.0014	0.1977	< 0.0001	
P value summary	**	**	ns	****	
Significant? (alpha = 0.05)	Yes	Yes	No	Yes	
Number of XY Pairs	28	28	28	28	

Conclusions

Upon conducting the research and analysing the statistical data, the following conclusions may be drawn:

The hypothesis of the research was partially confirmed: there are correlations between the results at the Ruffier test and the anthropometric indicators directly related to bodyweight only for FE and OW.

There are no correlations between RI and LMD.

A strong, statistically significant correlation has also been observed between the RI and the VO₂max level.

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Effect of Panax Ginseng and Dong Quai Products, in Acute Physical Stress

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Abstract

Background. Panax Ginseng (PG), and Angelica sinensis, also called female ginseng or Dong Quai (DQ) are well known for their adaptive role.

Objectives. The objective was to highlight the effect of Panax Ginseng and Dong Quai products, in intense acute and short term stress.

Methods. 40 healthy men were voluntarily enrolled in 4 groups: control (C), placebo (P=10), Panax Ginseng product (PG=10), Dong Quai product (DQ=10). P, PG, DQ were administered for 21 days before the acute physical stress, the same for all groups: an intense exercise made with a Monark 839e Ergometric cycloergometer. The analyzed parameters: anxiety (A), heart rate (HR) and glycemia (G). Evaluation moments: before P, PG, DQ administration (T1), 15 min before physical stress (T2), 15 min (T3) and 4 hours (T4) after physical stress. The results obtained were analysed using SPSS statistical package.

Results. Parameters were significantly increased for C and P: at T2 and T3 compared to T1, for A and HR; at T3 and T4 compared to T1, for G. Parameters were significantly increased for C and P compared to PG, and DQ: at T2 and T3, for A and HR; at T3 and T4, for G. There were moderate significant differences between PG and DQ: for A and HR, both at T2 and T3; for G, at T3 and T4.

The highest impact of PG and DQ, was on A and on T2. PG compared to DQ had a higher impact on A, HR and G.

Conclusions. 1) Under PG and DQ products administration, A and HR were significantly reduced before stress and G was significantly reduced after stress. 2) PG and DQ products were more efficient on A than on HR and G, especially immediately before the effort. 3) PG product, compared to DQ product, was more efficient for A, HR and G. 4) We suggest PG and DQ products may be useful in A, HR and G modulation in acute and intense physical stress, but further research is needed to deepen the mechanisms and application details.

Keywords: Panax Ginseng, Dong Quai, anxiety, heart rate, glycemia, acute physical stress

Introduction

Panax Ginseng (PG) and Angelica sinensis (AS), also called female ginseng or Dong Quai (DQ), are well known for their adaptive role. Ginseng (GSG) effectively regulates the immune response and the hormonal changes due to stress, prevents and suppresses stress-associated physiological diseases such as anxiety and depression, thus maintaining homeostasis (Lee & Rhee, 2017). Ginsenosides, which are extracted from the GSG are subdivided into about 100 different categories (Kim, 2012). The major commercial GSGs are: PG Meyer (Korean ginseng), P. quinquefolium L. (American ginseng) and P. notoginseng FH Chen (Notoginseng); PG is an adaptogenic agent that enhance physical performance, vitality, resistance to stress and aging, and have immunomodulatory activity (Kim, 2012). Dong Quai (Danggui, Chinese Angelica root, Angelica sinensis) is a folk medicine (Yeh et al., 2014), a traditional Chinese herbal remedy with a long history of use in China, Japan and Korea, still one of the herbs most commonly used by Traditional Chinese Medicine (TCM) practitioners in China, as well as Europe, mainly for the treatment of women's reproductive problems (Hook, 2014).

Hypothesis

PG and DQ are well known for their adaptive role. Less has been explored their influence on intense acute and short term stress induced by exercise, in sedentary people.

Objectives

We propose the evaluation of PG and DQ products, in intense acute and short term physical stress on psychological, functional and metabolic dimension, in stress induced by intense and short term physical effort, on sedentary subjects, by investigation of three indicators, anxiety (A), heart rate (HR) and glycemia (G).

Material and methods

Research protocol

a) *Period and place of the research*

Study have been carried out in August 2018, in the 122 Medical Family Cabinet in Cluj-Napoca.

b) *Subjects and groups*

40 healthy men were voluntarily enrolled in 4 groups: control (C) without treatment; who received placebo (P=10); who received Panax Ginseng product (PG=10); who received Dong Quai product (DQ=10). The average age was: 24,3±1 (C), 26,2±3 (P), 30,2±3 (PG), 31,4±4 (DQ). From the trials were excluded persons with mental disorders, cortisonic therapies of any kind and toxic addiction. Participants were asked to not consume alcohol, coffee, do not smoke and not to use any medication and no antioxidant the day before and during the physical effort.

c) *Tests applied*

1) *Study design*

All participants were subjected to the same type of stress: an intense and short term intense acute and short term physical effort on the cycle ergometer. Before physical testing, the participants followed a 8-min heating muscle, on a MONARK ERGOMEDIC 839E cycle ergometer, adjusted to 40 watt. After a 10 min break, followed the proper testing, realized on the same ergonomic bike. The effort test was carried out at a rate of pedaling 60 rotations/min, starting with a power of 30 watts, for 4 minutes followed by a gradual increase of power until the advent of fatigue feeling (perceived by each subject).

The products administered were: placebo; Panax Ginseng product, called Ginsenmax (1); and Dong Quai product, called Estrogen Natural (2), the last two being produced by Dacia Plant company, Brasov. All three products were administered for 21 days before the physical stress, in the dose of 3 tablets per day at 7.00-13.00-19.00 hours.

2) *The iniicators determination program* was the same for C, P, PG and DQ, beeing carried out as follows:

- time 1 = T1 - before P, PG, DQ administration
- time 2 = T2 - 15min before stress
- time 3 = T3 - 15min after stress
- time 4 = T4 - 4h after stress

3) *Explorations*

The analyzed parameters were:

- *anxiety (A)* - evaluated with Beck Anxiety Inventory
- *heart rate (HR)* - evaluated on the cyclogergometer
- *glycemia (G)* - evaluated with a portable glucometer

d) *Statistical processing*

The results obtained were analysed using SPSS 13.0. statistical package.

For continuous data examination, Student's t test has been used.

The differences were considered significant at a $p < 0,05$.

Results

A. Intra-group analysis (Tables I, II, III, IV, Fig. 1, 2, 3)

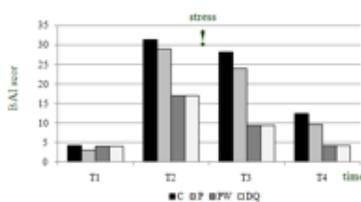


Fig. 1. Dynamic analysis of the average number of A values, for all groups

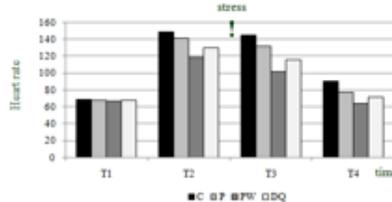


Fig. 2. Dynamic analysis of the average number of HR values, for all groups

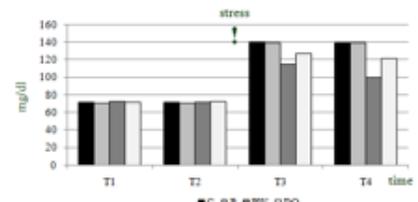


Fig. 3. Dynamic analysis of the average number of G values, for all groups

1) *Anxiety (A)* (Table 1, 2,3, 4). Dynamics of A values were similar for all groups (Fig. 1). A significantly increased: a) at T2 compared to T1, for C ($p < 0.00001$) and P ($p < 0.00001$); b) at T3 compared to T1, for C ($p < 0.00001$) and P ($p < 0.00001$); c) at T3 compared to T2, for PG ($p = 0.0003$) and DQ ($p = 0.00001$); d) at T3 compared to T1, for C ($p < 0.00001$) and P ($p = 0.0017$).

Table 1. Comparison of A values for C

C	T1	T2	T3	T4
Mean	4.3	31.4	28.1	12.4
SD	1.552	2.314	3.505	1.743
comparison with T1 - p		< .00001	< .00001	< .00001

Table 3. Comparison of A values for PG

PG	T1	T2	T3	T4
Mean	3.9	17	9.4	4.2
SD	1.577	2.898	2.8	1.326
T2-T3 comparison - p			0.0003	

Table 2. Comparison of A values for P

P	T1	T2	T3	T4
Mean	2.9	29.1	24	9.6
SD	1.135	3.014	2.898	1.907
comparison with T1 - p		< .00001	< .00001	0.0017

Table 4. Comparison of MDA values for DQ

DQ	T1	T2	T3	T4
Mean	3	19.3	12.9	6
SD	1	2.238	2.624	2.144
T2-T3 comparison - p			0.00001	

2) Heart rate (HR) (Tables 5, 6, 7, 8). Dynamics of HR values were similar for all groups (Fig. 2). HR significantly increased: a) at T2 compared to T1, for C ($p < 0.00001$) and P ($p < 0.00001$); b) at T3 compared to T1, for C ($p < 0.00001$) and P ($p < 0.00001$); c) at T3 compared to T2, for PG ($p = 0.01$) and DQ ($p = 0.0015$); d) at T3 compared to T1, for C ($p < 0.00006$) and P ($p = 0.0017$).

Table 5. Comparison of HR values for C

C	T1	T2	T3	T4
Mean	68.7	148.9	145.1	90
SD	5.78	15.365	15.254	11.874
comparison with T1 - p		< .00001	< .00001	.00006

Table 7. Comparison of HR values for PG

PG	T1	T2	T3	T4
Mean	66.8	118.8	102.1	64.3
SD	3.969	12.488	15.286	2.147
T2-T3 comparison - p			0.01	

Table 6. Comparison of HR values for P

P	T1	T2	T3	T4
Mean	67.6	141.4	132.1	76.9
SD	3.746	11.842	11.1395	7.435
comparison with T1 - p		< .00001	< .00001	.0017

Table 8 Comparison of HR values for DQ

DQ	T1	T2	T3	T4
Mean	67.6	129.5	116.2	71.9
SD	6.086	7.839	8.715	3.014
T2-T3 comparison - p			0.0015	

3) Glycemia (G) (Tables 9, 10, 11,12). Dynamics of G values were similar for all groups (Fig. 3). G significantly increased: a) at T3 compared to T1, for C ($p < 0.00001$) and P ($p < 0.00001$); b) at T4 compared to T1, for C ($p < 0.00001$) and P ($p < 0.00001$); c) at T4 compared to T3, for PG ($p = 0.0018$) and DQ ($p = 0.001$).

Table 9. Comparison of G values for C

C	T1	T2	T3	T4
Mean	71.2	71.9	140.3	139.4
SD	2.821	2.808	10.517	2.615
comparison with T1 - p			< .00001	< .00001

Table 11. Comparison of G values for PG

PG	T1	T2	T3	T4
Mean	72.1	71.7	114.9	99.4
SD	2.879	2.451	13.224	4.386
T2-T3 comparison - p				.0018

Table 10. Comparison of G values for P

P	T1	T2	T3	T4
Mean	71	71	139	139
SD	2.28	3.193	8.449	2.828
comparison with T1 - p			< .00001	< .00001

Table 12. Comparison of G values for DQ

DQ	T1	T2	T3	T4
Mean	71.9	72.3	127.3	121.4
SD	2.467	2.685	11.402	13.507
T2-T3 comparison - p				.001

B. Inter-Group Analysis (Table 13). Parameters were significantly increased for C and P compared to PG, and DQ:

a) for A:

- at T2 - C-PG; P-PG; C-DQ; P-DQ
- at T3 - C-PG; P-PG; C-DQ; P-DQ

b) for HR:

- at T2 - C-PG; P-PG; C-DQ; P-DQ
- at T3 - C-PG; P-PG; C-DQ; P-DQ

c) for G:

- at T3 - C-PG; P-PG; C-DQ; P-DQ
- at T4 - C-PG; P-PG; C-DQ; P-DQ

There were moderate significant differences between PG and DQ:

- a) for A, at T2 (p=0.037) and T3 (p<0.006)
- b) for HR, at T2 (p=0.021) and T3 (p=0.013)
- c) for G, at T3 (Cp=0.023) and T4 (p<0.0001)

The highest products impact was on A and on T2, both for

PG (mean=17, vs means of C=31.4 and P=29.1) and DQ (mean =19.3, vs means of C=31.4 and P=29.1).

Table 13. The p value for Anxiety, Heart rate and Glycemia, at inter-group comparisons

Parameter	Comparison	p		
		T2	T3	T4
A	C-PG	< .00001	< .00001	-
	P-PG	< .00001	< .00001	-
	C-DQ	< .00001	< .00001	-
	P-DQ	0.0001	< .00001	-
	PG-DQ	0.037	0.006	-
HR	C-PG	0.0001	0.00001	-
	P-PG	0.0004	0.00008	-
	C-DQ	0.0016	0.00005	-
	P-DQ	0.0108	0.0016	-
	PG-DQ	0.021	0.013	-
G	C-PG	-	0.0001	< .00001
	P-PG	-	0.0001	< .00001
	C-DQ	-	0.0017	< .00001
	P-DQ	-	0.0017	< .00001
	PG-DQ	-	0.023	0.0001

Discussion

1) *Specifications*

This article is a continuation of previous research of the authors, regarding the topic of heart rate (Jurcău et al., 2012; Jurcău et al., 2017b), anxiety (Jurcău et al., 2011; Jurcău & Jurcău, 2012) and glycemia (Jurcău et al., 2017a; Jurcău et al., 2018) assessments in stress and physical stress, as well as for the modulation of physical stress (Jurcău, 2012; Jurcău & Jurcău, 2014a; Jurcău & Jurcău, 2014b; Jurcău et al., 2016).

2) *Analysis for the results of the present study*

Through the present study it was carried out a comparative analysis of the impact of PG and DQ products, in intense acute and short term physical effort, on sedentary persons.

a) *The intra-group analysis. Differences for A and HR values were:* intensively significant for C and P at T2, T3 and T4, compared to T1; moderately significant for PG and DQ, at T3 compared to T2. *Differences for G values were:* intensively significant for C and P at T3 and T4, compared to T1; moderately significant for PG and DQ, at T4 compared to T3.

b) *The inter-group analysis. Analysis for A and HR.* Modification of A and HR was anticipatory, relative to stress (T2). A and HR values remained elevated also immediately post-stress (T3), then they decreased to T4. A and HR dynamics were similar for all groups. C-P differences were reduced, at all moments T2, T3, T4. *Analysis for G.* Modification of G was the most important post physical stress (T3), but the values remained elevated at T4 as well, for all groups. C-P differences were reduced at T3 and T4. Products with PG and DQ significantly reduced the impact of physical stress on G, post-effort, thus reducing the hyperglycemic effect of stress.

So, products we used, with PG and DQ, significantly reduced the impact of physical stress on A and HR, especially pre- and post-effort, and on G post-effort, thus providing an important antistress protection. Also, PG product and DQ product significantly reduced the effect of physical stress: at T2, T3 and T4, for A and HR; and at T3 and T4, for G. However, PG compared to DQ had a higher impact on A, HR and G.

3) *Panax Ginseng. A Pubmed chronological evidence*

a) *PG - Anxiety relationship.* Ginsenoside Re (Gr) may be a useful agent for treating complex symptoms of depression, anxiety, and cognitive impairment (Lee et al, 2012). PG may exhibit the anxiolytic effect via γ -aminobutyrateA (GABAA) receptor(s) and serotonergic receptor(s), respectively (Oh et al., 2015). Other ginsenoside, Rb1 (GRb1), blocked the induced effects of a single prolonged stress: decrease in hypothalamic neuropeptide Y expression, increase in locus coeruleus tyrosine hydroxylase expression, and decrease in hippocampal mRNA expression of brain-derived neurotrophic factor; these findings suggest that GRb1 has anxiolytic-like effects on both behavioral and biochemical symptoms similar to those observed in patients with post-traumatic stress disorder (Lee et al., 2016). GSG is involved in adjusting the hypothalamic-pituitary-adrenal axis and controlling hormones, thus producing beneficial effects on the heart and brain (Lee & Rhee, 2017). In addition, PG and its components may have anti-inflammatory and anti-apoptotic effects, which leads to the preservation of brain nerves, and regulate the activity and secretion of nerve cells, exerting anti-depression and anxiolytic effects (Xie et al., 2018).

b) *PG - heart rate relationship.* Cardiovascular protection by ginsenosides (GS) may be partly mediated by the release of nitric oxide (NO), a potent antioxidant, and that the GS-enhanced release of NO from endothelial cells, especially from perivascular nitric oxidergic nerves in the corpus cavernosum (Chen, 1996). Korean red GSG water

extract (KGSG-WE) stimulates in vitro and in vivo angiogenesis (important for promoting cardiovascular disease) through the activation of the PI3K/Akt-dependent ERK1/2 and endothelial nitric oxide synthase signal pathways and their cross talk (Kim et al., 2007). KGSG-WE also inhibits arginase activity and negatively regulates NO production and reactive oxygen species generation in endothelium, so KGSG-WE may exert vasoprotective effects (Shin et al., 2013). Both in vitro and in vivo results indicate that GSG has potentially positive effects on heart disease through its various properties including antioxidation, reduced platelet adhesion, vasomotor regulation, improving lipid profiles, and influencing various ion channels (Lee & Kim, 2014).

c) *PG - glycemia relationship.* Hypolipidemic and hypoglycemic effects of Red GSG (RGSG) can be enforced by Bifidus fermentation and Bifidodotarium-fermented RGSG (FRG), what may improve hyperlipidemia and hyperglycemia; hmajor component of RG is ginsenoside Rg3 and major component of FRG is ginsenoside Rh2 (Trinh et al., 2007). More types of ginsenosides present in RGSG fermented (F-RGSG) have anti-diabetic activities; treatment with F-F-RGSG, as compared to normal RGSG, resulted in: higher oral glucose tolerance test levels in streptozotocin (STZ)-induced diabetic rats; significantly decreased serum glucose concentration and significantly increased serum insulin concentration, indicating its anti-diabetic effects (Kim et al., 2010). In subjects with impaired fasting glucose or type 2 diabetes, F-RGSG supplementation produced a significant reduction in postprandial glucose levels and an increase in postprandial insulin levels compared to the placebo group (Oh et al., 2014). In other study, after 3 weeks of malonyl ginsenosides (natural ginsenosides which exist in both fresh and air-dried ginseng) (MGR) administration, it was found a significant decrease of fasting blood glucose levels, compared to the diabetic control group, and significant increase of glucose disposal; the findings from this study suggest that MGR can alleviate hyperglycemia, hyperlipemia and insulin resistance of type 2 diabetes (Liu et al., 2013). Korean RGSG extract administration for 5 weeks decreased the fasting blood glucose and glycated hemoglobin (Hb-A1c) levels (Nam et al., 2018). Finally, a recent study shows that nonfermented PSG improves hypertriglycemia in high-fat diet fed mice, through regulation of the hepatic lipogenic pathway; in contrast, the effects of F-RGSG were mediated through increased apoA4, leading to decreased triglycerides, so, compositional changes in PGS caused by fermentation processing could be useful in the development of novel triglyceride-lowering therapies (Park et al., 2018).

d) *PG - physical effort.* Administration of ginsenoside Re (GRe), in rats, prior to immobilization stress significantly improved helpless behaviors and cognitive impairment, possibly through modulating the central noradrenergic system (Lee et al, 2012). Also, PG (administered as an extract) significantly increased the physical and intellectual work capacities (Oliynyk & Oh, 2013). Changbai Mountain GSG (CMG, *Panax ginseng* C.A. Mey), a traditional medicine commonly found in Northeast China, increases muscle mass, improves exercise performance and energy utilization, and decreases fatigue-associated parameters in vivo, because of the major component, ginsenoside Ro (Ma et al., 2017). In addition, PG components attenuated, in Wistar rats, urine metabolite changes, improving most of the metabolites altered by acute combined stress, represented by forced swimming and behavior restriction (Wang et al., 2018).

4) *Dong Quai. A Pubmed chronological evidence*

a) *DQ - Anxiety relationship.* AS essential oil at inhibited stress-induced hyperthermia, thus, it exhibits an anxiolytic-like effect (Chen et al., 2004).

b) *DQ - heart rate relationship.* The potent cardioprotective action of a traditional Chinese formulation comprising AS and Astragalus membranaceus (BEA) together with Polygonum multiflorum extract, may be related to its ability to sustain the myocardial glutathione antioxidant status under conditions of ischaemia-reperfusion - induced oxidative stress (Yim et al., 2000). Also, ultra-filtration extract mixture from AS and Hedysarum polybotrys has protection on cardiomyocytes injured by H₂O₂ through improving cell antioxidant ability, up-regulating heat shock protein 70 (hsp70) mRNA expression in cardiomyocytes and inhibiting caspase-3 activity (Li et al., 2011).

c) *DQ - glycemia relationship.* AS polysaccharide (ASP) increased hepatic glycogen and muscle glycogen concentrations, reduced insulin resistance (IR), restored impaired pancreatic/hepatic tissues or adipose tissues in streptozotocin-induced diabetic mice; thus, ASP exerted hypoglycemic benefits, associated with the amelioration of IR, so can be applied in the prevention and treatment of diabetes (Wang et al., 2015). Also, ASP reduced blood glucose levels and ameliorated insulin resistance via the regulation of related metabolic enzymes and by activating the PI3K/Akt pathway in high-fat diet-fed mice (Wang et al., 2016). In addition, AS significantly decreased total cholesterol, triglycerides, and LDL-C levels and has protective effects on atherosclerosis, in hyperlipidemia mice (Wu et al., 2016).

d) *DQ - physical effort.* Danggui Buxue Tang (DBT), a Chinese medicinal decoction that contains Radix AS (Danggui) and Radix Astragali (Huangqi) at a ratio of 1:5, increased capacity and can ameliorate chronic fatigue syndrome through immune modulation and may act to normalize cytokines and their related signaling pathways (Liu, Zhang & Li, 2011). AS has long been used in ergogenic aids for athletes (Yeh et al., 2014). Also, AS treatments

significantly increased endurance swimming time and blood glucose level, and decreased serum lactate, ammonia and CK levels; thus improved exercise performance and had anti-fatigue properties in mice and may be an effective ergogenic aid in exercise training (Yeh et al., 2014).

The results obtained in our study, on A, HR and G, by using PG and DQ products, are consistent with data from recent studies related to the changes of this parameters, under the action of PG and DQ. This study also confirms the modulating effect of PG and AS on physical effort. The difference from the quoted studies is that our study has shown that administration of Panax Ginseng and Dong Quai, in stress induced by, in intense acute and short term physical effort on sedentary persons.

Conclusions

1. Under PG and DQ products administration, A and HR were significantly reduced before stress and G was significantly reduced after stress.
2. PG and DQ products were more efficient on A than on HR and G, especially immediately before the effort.
3. PG product, compared to DG product, was more efficient for A, HR and G.
4. We suggest PG and DQ products may be useful in A, HR and G modulation in acute and intense physical stress, but further research is needed to deepen the mechanisms and application details.

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Four Adaptogens for Sports - Eleutherococcus, Schisandra, Rhodiola, Ginseng - A Review

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Abstract

Objectives. The objective was to highlight the interest for the research of four adaptogens for sports: Eleutherococcus senticosus (ES), Schisandra chinensis (SC), Rhodiola Rosea (RR) and Ginseng (GSG).

Results. ES has adaptogenic, ergogenic and anti-stress properties. ES in sport was used for: athletes, skiers, runners, baseball players. ES effects in sport: increases - resistance to hypoxemia, production of plasma free fatty acid, endurance time and capacity, adaptation to increased exercise demands, maximal work capacity, physical and mental work performance; decreased - the time runners, glucose level. SC is distributed in East Russia, China, Japan and Korea. SC effects: stimulate central nervous system, improve visual function and night vision, anti-fatigue, anti-ageing, sedative and tonic. SC in sport: improve physical and mental performance; increases endurance, physical working capacity, accuracy of movement; decreases serum cortisol and glycemia in physical stress. RR is used in Asian traditional medicine. RR supplements improve attention, mood, cognitive performance, modulate depression. RR in sport: relieve fatigue; increase time to exhaustion, pulmonary ventilation and endurance exercise performance; decreases heart rate and perception of effort. RR have also antioxidant effects in during and after heavy physical activity - decrease superoxide dismutase activity and lactate levels; increase antioxidant capacity and fatty acid consumption. GSG was used for thousand years in Asia. GSG effects: tonic, anti-stress, improves alertness memory and attention and cerebroelectrical activity. GSG in sport: increase physical performance, aerobic capacity and exercise duration, decrease lactate production and heart rate, facilitates recovery from exhaustive exercise. GSG in sedentary and moderately trained persons: increases performances, decrease fatigue, has beneficial effects on the central nervous system, adrenal and sexual function. ADAPT-232 in a product containing ES, SC and RR, that increase speed, improve performing stressful cognitive tasks and attention.

Instead of conclusions. Eleutherococcus senticosus, Schisandra chinensis, Rhodiola Rosea and Ginseng, herbs described as adaptogens, are currently used to enhance physical performance.

Key words: Eleutherococcus senticosus, Schisandra chinensis, Rhodiola Rosea, Ginseng, adaptogens, sport

Introduction

„Herbs have been used throughout history to enhance physical performance” (Bucci, 2000). Adaptogens were described as „substances of plant origin which increase nonspecific resistance” (Brekhman, Dardymov, 1969). Of them, four are of big importance: Eleutherococcus senticosus (ES), Schisandra chinensis (SC), Rhodiola Rosea (RR) and Ginseng (GSG). ES is a plant that „growth in Asia” (Davydov, Krikorian, 2000). SC is „distributed in East Russia, China, Japan and Korea” (Panossian, Wikman, 2008). RR is „used as traditional herbal medicines” (Booker et al., 2016). GSG is used in „numerous Asian countries, particularly China and Korea, in the dietary and medicinal domain” (Sellami et al., 2018). ADAPT-232 in a „product containing ES, SC and RR” (Panossian et al., 2009).

Hypothesis

ES, SC, RR and GSG are well known for their adaptive role. Less has been explored their comparative influence on some features related to sports, by referring to quotes of PubMed publications.

Objectives

The objective was to highlight the interest for the research of four adaptogens, for sports: Eleutherococcus senticosus (ES), Schisandra chinensis (SC), Rhodiola Rosea (RR) and Ginseng (GSG).

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Material and methods

Analysis of PubMed publications was done for the four selected adaptogens: ES, SC, RR, GSG. To evaluate the relationship of the four adaptogens chosen with sport, we selected the following areas of analysis, that are frequently approached related to sports (SP) and athletes (AT): stress (S), fatigue (F) endurance (ED) and performance (P).

Adaptogens - sport relationship was analysis for the keywords combinations. The same keyword combinations were selected for the four adaptogens. They are presented with their abbreviations (Abb) in Table 1.

Table 1. Keyword combinations for the four adaptogens

Keyword combinations	Abb	Keyword combinations	Abb	Keyword combinations	Abb	Keyword combinations	Abb
ES and physical stress	ES+PS	SC and physical stress	SC+PS	RR and physical stress	RR+PS	GSG and physical stress	GSG+PS
ES and sports	ES+SP	SC and sports	SC+SP	RR and sports	RR+SP	GSG and sports	GSG+SP
ES and athletes	ES+AT	SC and athletes	SC+AT	RR and athletes	RR+AT	GSG and athletes	GSG+AT
ES and physical fatigue	ES+PF	SC and physical fatigue	SC+PF	RR and physical fatigue	RR+PF	GSG and physical fatigue	GSG+PF
ES and endurance	ES+E	SC and endurance	SC+E	RR and endurance	RR+E	GSG and endurance	GSG+E
ES and performance	ES+P	SC and performance	SC+P	RR and performance	RR+P	GSG and performance	GSG+P

Analysis for all keywords combination, was done for some filters, with their corresponding sub-filters:

- *Species*: other animals (A), humans (H)
- *Sex*: human male (HM), human female (HF), human male and female (HM+HF)
- *Ages*: birth-18 years (0-18), 19-44 years (19-44), 45-64 years (45-64), 65+years (>65), 80+years (>80)

Results

This data collection was October 2018. For all groups, data distribution was normal, according to the Kolmogorov-Smirnov test. The analysis has been made on the chosen time periods.

a) *Comparative analysis of adaptogenes, by keyword Physical stress (PS) (Fig. 1)*. Most PS publications were for: GSG+PS, at all sub-filters, except >80; for RR+PS, at >80. The fewest PS publications were for SC+PS, at all sub-filters, except >80. For all combinations adaptogene+PS, most of the publications were for: A, followed by HM+HF and 19-44.

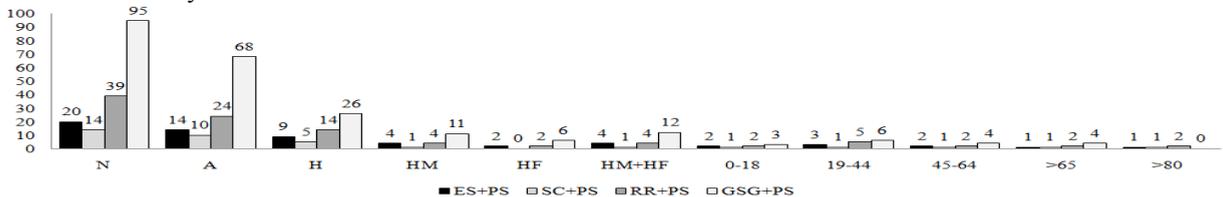


Fig. 1. Comparative analysis of adaptogenes, by keyword PS

b) *Comparative analysis of adaptogenes, by keyword Sports (SP) (Fig. 2)*. Most S publications were for: GSG+S, at all sub-filters. The fewest PS publications were for SC+S, at all sub-filters. For all combinations adaptogene+S, most of the publications were for: A, followed by HM and 19-44.

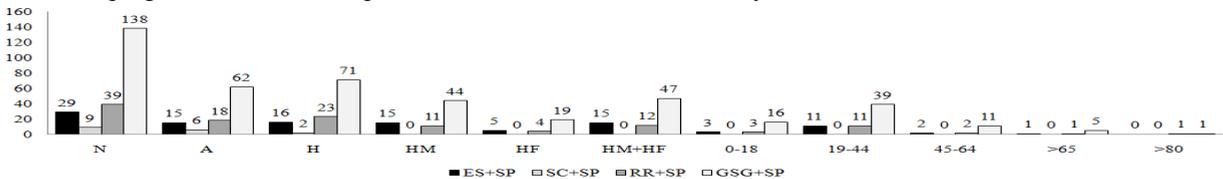


Fig. 2. Comparative analysis of adaptogenes, by keyword SP

c) *Comparative analysis of adaptogenes, by keyword Athlets (AT) (Fig. 3)*. Most AT publications were for: GSG+AT, at all sub-filters. The fewest PS publications were for SC+AT, at all sub-filters. For all combinations adaptogene+AT, most of the publications were for: A, followed by HM equal to HM+HF, and 19-44.

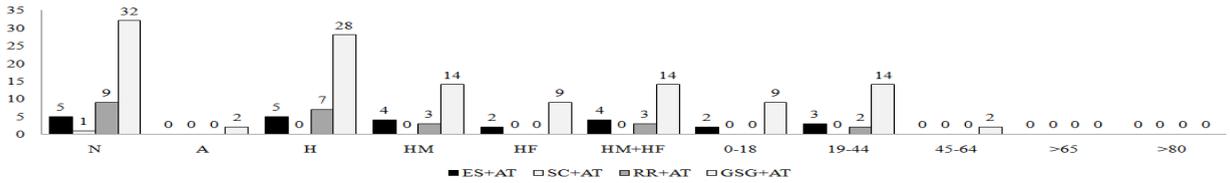


Fig. 3. Comparative analysis of adaptogens, by keyword AT

d) Comparative analysis of adaptogens, by keyword Physical fatigue (PF) (Fig. 4). Most PS publications were for: GSG+PF, at all sub-filters, except >80; for the other adaptogens, at >80. The fewest PS publications were for SC+PS, at all sub-filters, except >80. For all combinations adaptogene+PF, most of the publications were for: A, followed by HM+HF and 19-44.

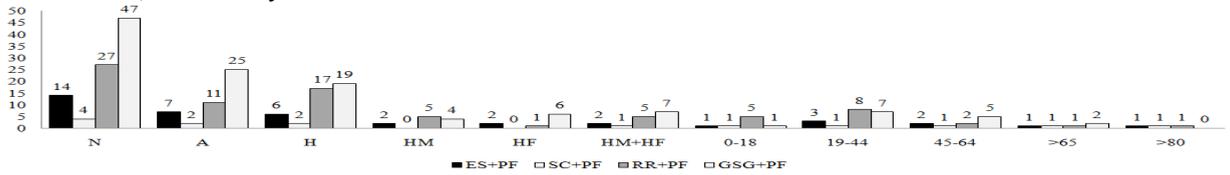


Fig. 4. Comparative analysis of adaptogens, by keyword PF

e) Comparative analysis of adaptogens, by keyword Endurance (E) (Fig. 5). Most E publications were for: GSG+E, at all sub-filters, except >80; for the other adaptogens, at >80. The fewest PS publications were for SC+E, at all sub-filters, except >80. For all combinations adaptogene+E, most of the publications were for: A, followed by HM+HF and 19-44.

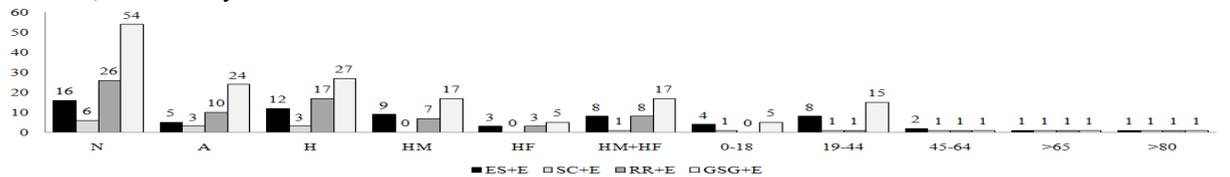


Fig. 5. Comparative analysis of adaptogens, by keyword E

f) Comparative analysis of adaptogens, by keyword Performance (P) (Fig. 6). Most P publications were for: GSG+P, at all sub-filters. The fewest PS publications were for ES+P, at all sub-filters. For all combinations adaptogene+P, most of the publications were for: A, followed by HM+HF and 19-44.

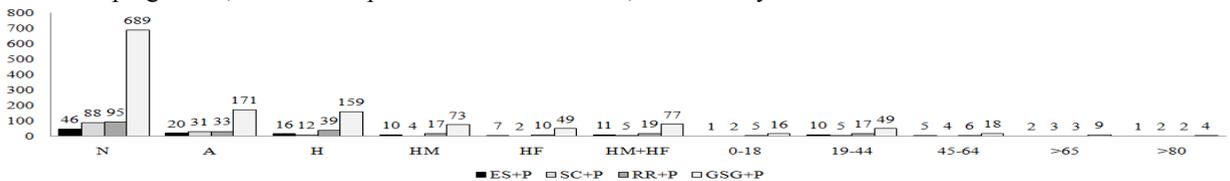


Fig. 6. Comparative analysis of adaptogens, by keyword P

Discussion

5) Specifications

This article is a continuation of previous research of the authors, regarding the topic of sport and stress (Jurcău & Jurcău, 2014a; Jurcău & Jurcău, 2014b); sport and plant supplements (Jurcău & Jurcău, 2014c); stress, sport and SC (Jurcău et al., 2018a; Jurcău et al., 2013); sport and RR (Jurcău et al., 2017; Jurcău & Jurcău, 2018c); stress, sport and GSG (Jurcău et al., 2018a; Jurcău et al., 2018b).

6) Analysis for the results of the present study

For all selected keyword combinations with specific reference to sports (PS, SP, AT, PF, E, P), the highest interest was for GSG studies except for PS/PF > 80, and lowest interest for SC studies, except P, where was the lowest interest for ES studies.

7) Exemplification of actions of the selected adaptogens. A Pubmed quote evidence

It was done for four areas related to sports namely: stress, fatigue, endurance and performance. For the authenticity of the

information, we preserved the original form, in the quotations made.

a. Herbs and sport

„Athletes, coaches, and health professionals who work closely with athletes are consistently looking for sound, effective ways to enhance health and performance with foods, fluids, and dietary supplements” (Kundrat, 2005). „Many contemporary herbal medicines have survived for centuries because they are believed to have therapeutic medicinal (although not ergogenic) value applicable to physically active individuals” (Williams, 2006). „Herbs are non-woody plants or parts of plants that have long been valued for their medicinal or therapeutic value, especially in China” (Kundrat, 2005). „Herbal medicinal products and supplements have health benefits attributed to their bioactive compounds such as Polyphenols, Terpenoids, Alkaloids; they are also used to enhance muscle strength and body mass” (Sellami et al., 2018). For example, a study showed that „more than half of 162 collegiate female athletes used some type of supplement at least once a month” (Herbold et al., 2004).

b. Adaptogens

„The definition of an adaptogen first proposed by Soviet scientists in the late 1950s, namely that an adaptogen is any substance that exerts effects on both sick and healthy individuals by 'correcting' any dysfunction(s) without producing unwanted side effects, was used as a point of departure” (Davydov, Krikorian, 2000). So, „adaptogens are medicinal plants that augment resistance to stress, and increase concentration, performance and endurance during fatigue” (Panossian et al., 2009). „The most extensively studied adaptogens are *Rhodiola rosea*, *Schisandra chinensis* and *ES*” (Panossian A, Wikman G, 2010).

a) *ES* is a plant that „growth in areas like eastern Russia, especially Sakhalin, China, Japan and Korea often referred as ‘Siberian ginseng’, with extensive use probably derives only from the mid-1950s and early 1960s” (Davydov, Krikorian, 2000).

b) *SC* „stimulate central nervous system (Zhestyanikov, 1945), improve visual function and night vision (Trusov, 1945) and has tonic effects” (Sorokhtin, 1955).

c) *RR* is „widely used as medicines and food additives by many civilizations since ancient times; their main effective ingredients are praised to exhibit pharmacologic effects on high-altitude sickness and possess anti-aging and other adaptogenic capacities based on their antioxidant properties” (Cui et al., 2015). For example, „studies on isolated organs, tissues, cells and enzymes have revealed that *RR* preparations exhibit adaptogenic effect including, neuroprotective, cardioprotective, anti-fatigue, antidepressive, anxiolytic, nootropic, life-span increasing effects and CNS stimulating activity, increases mental performance” (Panossian, Wikman, Sarris, 2010).

d) *GSG* „There are several species of *GSG* such as American ginseng, Canadian ginseng (*Panax quinquefolius*), Siberian ginseng (*Eleutherococcus senticosus*), Asian ginseng, Chinese ginseng, Korean ginseng” (Sellami et al., 2018). Of *GSG*, „ginsenoside Rg3 (Rg3) is one of the key components, frequently used for fatigue treatment” (Yang et al., 2018).

e) *ADAPT-232* in a „product containing a combination of three native extracts of *Eleutherococcus senticosus*, *Schisandra chinensis* and *Rhodiola rosea*: eleutherosides, schisandrins, salidroside, tyrosol and rosavin” (Panossian et al., 2009).

c. *ES*, *SC*, *RR* and *GSG* adaptogens and sport

Stress

a) *ES*. „Liquid extract of *ES* in young healthy humans leads increase in the aural memory volume, decrease in reactive anxiety, and shortening of individual minute” (Arushanian, Mastiagina, 2009). *ES* has also an „increased antioxidative activity and is capable of improving overall non-specific body resistance” (Bekenev, Garcia, Hasnulin, 2015).

b) *SC*. „*SC* can reduce serum cortisol and blood glucose levels in stressed rats, appears to protect the cell structure of the adrenal cortex, and offset the negative effects of psychological stress and strenuous exercise related to immune dysfunction” (Li et al., 2015). Also, *SC* „has significant sedative and hypnotic activities, and the mechanisms might be relevant to the serotonergic and γ -aminobutyric acid (GABA)ergic system” (Zhu et al., 2016). *SC* has a „benefit to control age-related molecules against SIPS-induced chronic oxidative stress, so it may be a potential therapeutic compound for the enhancement of intracellular homeostasis to aging progression” (Kim et al., 2018).

c) *RR*. After *RR* supplementation „in competitive rowers, total plasma antioxidant capacity was significantly higher and superoxide dismutase activity in erythrocytes was significantly lower, so *RR* increased antioxidant levels” (Skarpanska-Stejnborn et al., 2009). *RR* is an „adaptogen plant which has been reported to promote fatty acids utilisation, to ameliorate antioxidant function, and to improve body resistance to physical strenuous efforts” (Parisi et al., 2010). *RR* extract „may possess the anti-oxidant activities and reduce the production of lipid peroxide which may benefit for recovery from the physiological fatigue, so is proved to be a safe and effective food for promoting recovery from fatigue by mainly the antioxidant ability, reinforce the endurance ability and physical fitness performance” (Jung et al., 2017).

d) *GSG*. *GSG* „promotes vitality, increases resistance to stress and ageing; the adaptogenic properties of *GSG* are believed to be due to its effects on hypothalamic-pituitary-adrenal axis, resulting in elevated plasma corticotropin and corticosteroids levels” (Nocerino, Amato, Izzo, 2000). *GSG* treatment „provided good protection against electroshock stress and heat stress

experiments” (Banerjee, Izquierdo, 1982). GSG administration „produced elevation in catalase and superoxide dismutase activities, decrease of malondialdehyde level, and consequently prolong exercise duration until exhaustion, thus GSG has ergogenic properties in facilitating recovery from exhaustive exercise” (Kim et al., 2005).

e) *ADAPT-232*. *ADAPT-232* „induces adaptation to stress, enhances cognitive functions and, possibly, longevity; works like a stress-mimetic by activating stress-induced self-defence mechanisms in order to adapt the cell and organism to mitigate stress-induced harmful effects” (Panossian, Wikman, 2010). Supplementation with *ADAPT-232S* „improved the adaptation to physical and emotional stress, Supplementation with *ADAPT-232S*, impulsivity and the perception of stress” (Hovhannisyan et al., 2015). For example, *ADAPT-232*, „in healthy females aged between 20-68 years stressed over a long period of time, improved attention and increased speed and accuracy during stressful cognitive tasks, reduce percentage of errors, under stressful conditions” (Aslanyan et al., 2017).

Fatigue

a) *ES*. *ES* „may provide an effective and powerful strategy to alleviate behavioral alterations induced by sleep deprivation” (Huang et al., 2011). *ES* may also „contribute to the anti-fatigue action, the recovery of the reduction of NK activity and the inhibition of corticosterone elevation induced by swimming stress” (Kimura, Sumiyoshi, 2004). More, *ES* „may enhance recovery from physical fatigue induced by forced swimming by accelerating energy changes through fatty acid β -oxidation in skeletal muscle” (Sumiyoshi, Kimura, 2016).

b) *SC*. *SC* „increase the loaded-swimming time of mice; prolong the enduring time of hypoxia; decrease serum lactic acid and BUN; promote LDH activity after swimming, so has anti-fatigue and anti-hypoxia effects” (Zhang, Xu 2012).

c) *RR*. „Fermented *RR* extract was found to significantly increase swimming time, hepatic superoxide dismutase content, and serum lactate dehydrogenase in mice”, so „effectively protects against fatigue in strenuous exercise” (Kang et al., 2015). „Chronic *RR* extract, on swimming-induced fatigue in rats, significantly increased the swimming time, reduced serum BUN, GOT and GPT levels”, thus „significantly improved exhaustive swimming-induced fatigue by the increased glycogen content, energy supply of lipogenic enzyme expressions and protective defense mechanisms” (Lee et al., 2009).

d) *GSG*. After „administration of ginsenosides solution in exhaustive swimming experiment for rats, time of the exhaustive swimming was longer, the activity of superoxide dismutase was higher, the level of malonaldehyde of liver cells was lower, the liver glycogen, muscle glycogen and fumaric reductase were lower”, so „ginsenosides solution improve the tolerance of rats in fatigue and have the function of anti-fatigue” (Zhao et al., 2009). Treatment with „oligopeptides isolated from *Panax quinquefolium* L. (QOPs) in mice, on forced swimming, induced anti-fatigue effects, which may be due to the inhibition of oxidative stress and the improvement of mitochondrial function in skeletal muscles”, so „QOPs can be used as a novel natural agent for relieving physical fatigue” (Li and al., 2018). Ginsenoside „Rg3, in a postoperative fatigue syndrome model in mice, up-regulated the serum concentrations of total cholesterol, serum triglyceride and lactate dehydrogenase, increased concentrations of superoxide dismutase, decreased malondialdehyde release out of skeletal muscles”, so „Rg3 could resist fatigue possibly through elevating sirtuin1 deacetylase activity” (Yang et al., 2018).

e) *ADAPT-232*. „Supplementation with *ADAPT-232* reduce fatigue, increase the anabolic index and have very good tolerability profiles” (Hovhannisyan et al., 2015).

Endurance

a) *ES*. *ES* preparations „normalized the activity of the factors and fibrinolys, increased the working capacity and rehabilitation of the athletes after intensive physical activity of high-class” (Azizov, 1997). „*ES* supplementation significantly increased the production of plasma FFA, decreased the glucose level and enhanced endurance capacity in recreationally trained males in cycling trials” (Kuo et al., 2010).

b) *SC*. *SC* „increased endurance and mental performance in patients with mild fatigue and weakness” (Panossian, Wikman, 2009). In addition, „oral administration of *SC* fructus enhanced exercise-induced adaptive muscle strengthening in aged mice after forced swimming through anti-apoptotic and anti-oxidant effects, mediated via modulation of gene expression related to muscle synthesis or degradation”, so „it may be helpful as an adjuvant therapy to exercise-based remedies” (Kim et al., 2018).

c) *RR*. „Acute *RR* intake, by young healthy volunteers, increased time to exhaustion, VO_2 peak, pulmonary ventilation, so can improve endurance exercise capacity” (De Bock et al., 2004). More, „acute *RR* ingestion decreases heart rate response to submaximal exercise and appears to improve endurance exercise performance by decreasing the perception of effort on a bicycle ergometer” (Noreen et al., 2013). „Chronic *RR* supplementation is able to reduce both lactate levels and parameters of skeletal muscle damage after an exhaustive exercise session, ameliorate fatty acid consumption”, so „may increase the adaptogen ability to physical exercise” (Parisi et al., 2010).

d) *GSG*. *GSG* treatment, „in forced swim test, provided provided effective adaptation to fatigue and increased endurance in both male and female mice” (Banerjee, Izquierdo, 1982). „Red *GSG* in rats increased time to exhaustion for treadmill running, inhibited exercise-induced increases in 5-hydroxytryptamine synthesis and tryptophan hydroxylase expression in the dorsal

raphe, what suggest that the suppressive effect of Red GSG on serotonin level during exercise is a possible ergogenic mechanism” (Min et al., 2003). „Panax notoginseng supplement in young adults, for 30 days, improved endurance time to exhaustion, and lowered mean blood pressure and Vo₂ during endurance exercise” (Liang, Podolka, Chuang, 2005).

e) *ADAPT-232*. „In mice, it augmented endurance, increased the time taken to exhaustion” (Panossian et al., 2009).

Performance

a) *ES*. *ES* „decreased the time runners” (Halstead, Hood, 1984). In other study, „ethanol extract of *ES* given to healthy male athletes using bicycle ergometry, significantly increase overall work performance and time to exhaustion” (Asano et al., 1986). Also, „*ES* extract given to five male skiers increased their ability to adapt to increased exercise demands and the resistance to hypoxemia” (Farnsworth et al., 1985).

b) *SC*. „*SC* increases accuracy of movement and generates alterations in the basal levels of nitric oxide and cortisol in blood and saliva, increases endurance and accuracy of movement, mental performance, with subsequent effects on the blood cells, vessels and CNS” (Panossian, Wikman, 2008). „*SC* tincture caused a statistically significant increase in the time of running, increase in the working capacity, increased the swimming time of the animals” (Azizov, Seifulla, 1998).

c) *RR*. „*RR* extract exhibited an antiinflammatory effect and protected muscle tissue during exercise” (Abidov et al., 2004). In astudy, „treatment of *RR* extracts for 4 weeks could reduce swimming-enhanced oxidative stress possibly via the reactive oxygen species scavenging capability and the enhancement of the antioxidant defense mechanisms”, so „significantly increased swimming performance (Huang et al., 2009). Other study showed that *RR* „may have beneficial effects on physical performance, mental performance, and certain mental health conditions” (Hung, Perry, Ernst, 2011). For example, „after *RR* administration in physically active college aged females, mean watts, mean anaerobic capacity, mean anaerobic power, mean peak watts and mean total work were higher in the *RR* treatment versus placebo”, thus „*RR* enhanced anaerobic exercise performance and may possess ergogenic benefits” (Ballmann et al., 2018).

d) *GSG*. *GSG* treatment, „not depress motility in the locomotor activity tests” (Banerjee, Izquierdo, 1982) and „enhances physical performance” (Nocerino, Amato, Izzo, 2000). „In soccer players, *GSG* extract shorten reaction time at rest and during exercise, shifting the exercise load associated with the shortest RT toward higher exercise loads”, so „*GSG* extract does improve psychomotor performance during exercise without affecting exercise capacity” (Ziemba et al., 1999). „Controlled studies of Asian *GSG* found improvements in exercise performance, muscular strength, maximal oxygen uptake, work capacity, fuel homeostasis, serum lactate, heart rate, visual and auditory reaction times, alertness, and psychomotor skills” (Bucci, 2000). Other study showed that „*GSG* extract, administered in animal experiments and human studies, significantly increased the physical and intellectual work capacities, suggesting that *GSG* is a natural source of actoprotectors” (Oliylyk, Oh, 2013). In a recent study, „Changbai Mountain Ginseng extract supplementation, in mice swimming, increased muscle mass, improved exercise performance and energy utilization, and decreased fatigue-associated parameters in vivo”, due to „ginsenoside Ro, which could be a potential bioactive compound for use as an ergogenic aid ingredient” (Ma et al., 2017). „Rg3 increased the journey distance, while slowed down the rest time”, so „it could improve exercise performance possibly through elevating sirtuin1 deacetylase activity” (Yang et al., 2018). Also, „high-dose ginsenoside supplementation, in sedentary individuals that underwent aerobic and resistance exercise training course, augmented the improvement of aerobic capacity by exercise training” (Lee et al., 2018).

e) *ADAPT-232*. „Supplementation with *ADAPT-232S*, increased the recovery of athletes after heavy physical and emotional loads; *ADAPT-232S* might be useful for recovery of athletes after exercising and for prevention of the symptoms of overtraining” (Hovhannisyan et al., 2015). Also, „supplementation with *ADAPT-232S*, increased physical performance of athletes after heavy physical and emotional loads, significantly decreased inattention” (Hovhannisyan et al., 2015).

Instead of conclusions

Even if the research is still moderately numerically related to their involvement in physical effort, *ES*, *SC*, *RR* and *GSG*, herbs described as adaptogens, are curenly used in sport, especially in athletes, to reduce fatigue, and to enhance endurance and physical performance.

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Statistical Study on the Incidence of Thrombotic Cerebral Infarction

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Abstract

Stroke represents one of the most important causes of mortality and disability in the world. Romania is among the European countries with the highest rate of stroke, which represents the third mortality cause after cancer and the cardiovascular diseases.

The purpose of the paper is to identify the incidence of thrombotic cerebral infarction in the region of Moldavia.

The sample of patients was selected through data from the statistical department of the “Prof. Dr. Nicolae Oblu” Clinical Emergency Hospital in Iași.

Material and method: the study was carried out using the statistical method, in order to analyze the incidence of thrombotic cerebral infarction in the region of Moldavia.

Conclusion: the study represents a depiction of thrombotic cerebral infarctions in the region of Moldavia, which helped us acquire an overall image regarding the incidence of this disease.

Keywords: stroke; incidence; disability.

Introduction

According to the latest World Health Organization data published in 2017, stroke deaths in Romania reached 44.547 or 18.83% of total deaths.

Stroke is defined by the World Health Organization (WHO) as a clinical syndrome consisting of rapidly developing clinical signs of focal disturbance of cerebral function lasting more than 24 h or leading to death with no apparent cause other than a vascular origin (Chandrasekhar D., et. al., 2018).

Stroke is a medical emergency that generates devastating neurological deficits and is the major cause of death and adult disability worldwide. It occurs when a cerebral blood vessel is blocked (ischemic stroke) or is ruptured (hemorrhagic stroke). (Zhenhua Zhou et.al., 2018)

Stroke is a leading cause of long-term disability worldwide. However, there are no effective therapies available for promoting stroke recovery. Brain ischemia stimulates ongoing neurogenesis, which leads neuronal precursor cells to migrate to ischemic regions to support remodeling of damaged tissue (Haochen Xu et al., 2017).

Brain infarction results from a severe occlusion of cerebral artery, leading to the lack of oxygen and nutrients to the affected area, as well as causing the breakdown of the blood brain barrier (BBB). Consequently, neuronal cell death is provoked evoking a cascade of inflammatory events, including the activation of parenchymal glial cells and a time-dependent recruitment and extravasation of peripheral immune cells at the site of injury (Cisbani G., et. al., 2018).

The timely evaluation and diagnosis of ischaemic stroke is important given the narrow therapeutic time window in which intravenous recombinant tissue plasminogen activator (IV-tPA) should be administered. Current protocols for evaluation and diagnosis of acute stroke recommend the use of non-contrast brain computed tomography (McAlister F. A. et. al., 2018).

The number of stroke-related deaths is increasing and stroke remains one of the major causes of deaths and disability worldwide. Between 1990 and 2010, the global incidence rate of stroke seemed to be stable, while other parameters such as the incidence of first stroke, prevalence of stroke, disability-adjusted life-years lost due to stroke, and the number of stroke-related deaths increased by 68, 84, 12, and 26%, respectively. Differences between rates and numbers might reflect variations in population structure, increase in life expectancy, and the global improvement of health care services (Marei HE., et. al., 2018).

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Stroke is a potentially fatal or highly debilitating condition with multiple consequences for patients and their families, as well as healthcare providers and society. It is the second most common cause of death worldwide and the leading cause of disability in adults. Approximately 80% of all strokes are ischemic due to occlusion of a vessel, and comprise two main types, thrombotic and embolic. Thrombotic cerebral infarction accounts for almost 50% of all strokes (Martinez B & Peplow PV, 2017).

Hypertension, diabetes, tobacco use and other traditional vascular risk factors are known to increase the risk of stroke. The role of genetic mutations in cerebral ischemia, however, is less clearly established (Gabriela T., et al., 2018).

A better understanding of high-risk individuals with cancer and ischemic stroke could facilitate targeted interventions to reduce RTE rates. In 2008, the Khorana score was proposed to stratify the risk of venous thromboembolism in cancer patients beginning chemotherapy. A recent large cohort study reported that in the first 6 months after diagnosis, 4.7% of patients with incident cancer develop an arterial thromboembolic event, and that these patients face a twofold higher risk of arterial events than matched controls without cancer (Murthy SB et al., 2018).

Congenital heart disease patients are at high risk of developing thrombosis for various reasons: the type of cardiac defect, CHD-related complications, and stage of their care. For example, many of the structural cardiac abnormalities lead to changes in blood rheology or to natural anticoagulant deficiencies due to hepatic hypoperfusion secondary to impaired heart function, further contributing to a hypercoagulable state (Silvey M & Brandão LR, 2017).

Atrial fibrillation (AF) is the most common sustained arrhythmia in clinical practice and is associated with serious clinical conditions, such as ischemic heart disease and stroke (X.Wang, et al., 2017).

Stroke being a devastating and physically debilitating disease may affect the routine activities, disrupt life, and decrease overall quality of life of survivors and their families as well. Majority of the stroke survivors have to live with various impairments of varying severity throughout their life making them partially or fully dependent on their caregivers. Family caregivers are critical partners in the plan and provision of care for the patients. 25-74% of stroke survivors require help with activities of daily living from informal caregivers, often the family members (Kaur P., et. al., 2018, Braniste T., Arsenescu-Georgescu C., Braniste G., Dorgan V., 2018).

Post stroke complication include pressure ulcer, dysphasia, pain, respiratory infections, urinary tract infection, fever, depression, deep vein thrombosis, pulmonary embolism, myocardial infarction and cardiac arrhythmias, congestive heart failure, urinary retention and peptic ulcers. These complications have adverse effects on the physical and mental status of these patients and involve their on other hand have an economic burden to society. Complications of stroke in the early days of hospitalized patients significantly increasing mortality rate. Frequent assessment of neurological status, blood pressure, blood sugar and temperature control and identify early stroke complication is the key to success in the care of these patients (Ahangar AA., et al., 2018).

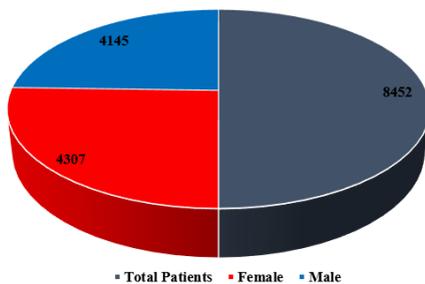
Material and method

This paper was elaborated using the data archived at the statistical department of the “Prof. Dr. Nicolae Oblu” Clinical Emergency Hospital in Iași. Using this information, we managed to follow the evolution of thrombotic cerebral infarctions in the last ten years. We have also interpreted statistically the evolution of this phenomenon for the year 2017 in order to determine whether the pathology is rising in the region of Moldavia. Furthermore, in this study we analyzed the prevalence of thrombotic cerebral infarctions by gender.

Findings

In order to highlight the results obtained, we interpreted graphically the sampled data and we distributed them on categories in order to have an overall image of the studied phenomenon.

a.



b.

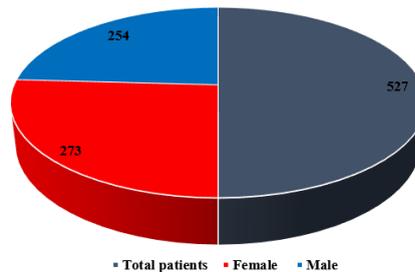


Fig. 1. (a) Patients with thrombotic cerebral infarction from 2007-2017

Fig. 1. (b) Patients with thrombotic cerebral infarction from 2017

According to Figure 1 (a), the number of thrombotic cerebral infarctions that occurred in the period 2007-2017 is 8,452 among which 4,307 were encountered in the female population and 4,145 among male individuals. Concerning the year 2017, 572 thrombotic cerebral infarctions occurred: 273 patients were female and 254 male, according to figure 1 (b).

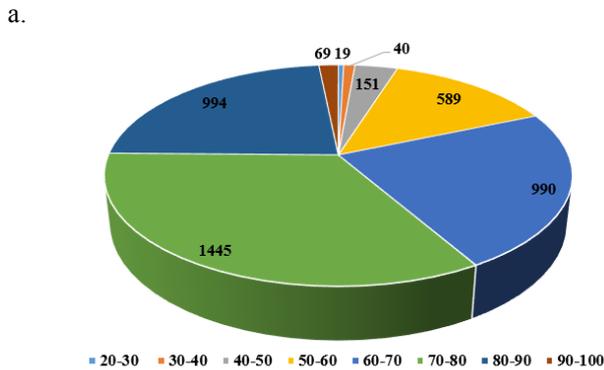


Fig. 2. (a) Female patients with thrombotic cerebral infarction from 2007-2017, by age category

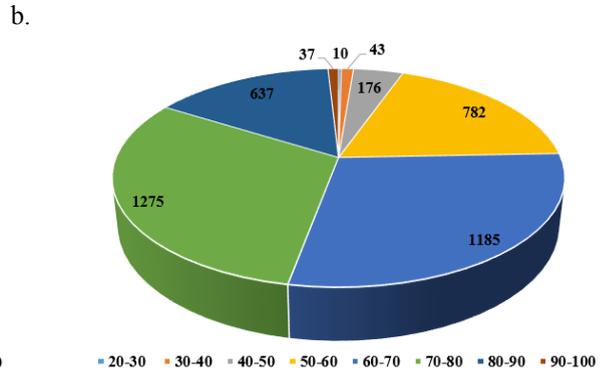


Fig. 2. (b) Male patients with thrombotic cerebral infarction from 2007-2017, by age category

Figure 2 (a,b) features the incidence of thrombotic cerebral infarctions by age category (10 years), in the period 2007-2017. As shown in Figure 2 (a), the highest rate of stroke in case of female subjects is recorded in the category 70-80 years old, with a number of 1,445 patients. The same thing goes for male subjects, thus recording 1,275 thrombotic cerebral infarctions in the category of 70-80 years old. Unfortunately, a high incidence of strokes is recorded for both samples (female and male) and in age categories of 60-70 years old (994 women, 637 men) and 80-90 years old (990 women, 1185 men). A lower but still significant number of thrombotic cerebral infarctions also occurred in the age category of 50-60 years old (589 women, 782 men), the prevalence decreasing by age (151 women and 176 men, in the category of 40-50 years old). At the two extremes of the age categories of 20-30 years old (19 women, 10 men) and 90-100 years old (69 women, 37 men) the incidence is low, the number of patients with thrombotic cerebral infarction being small.

In the age category of 30-40 years old, there was also a lower number of cases (40 women and 43 men).

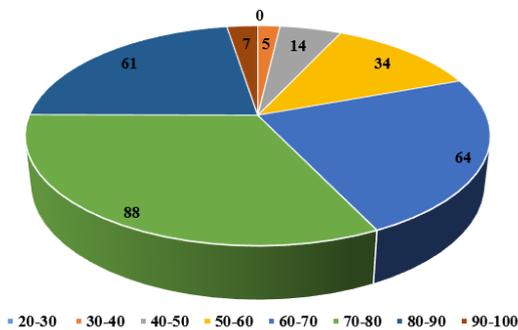


Fig. 3. (a) Female patients with thrombotic cerebral infarction from 2017, by age category

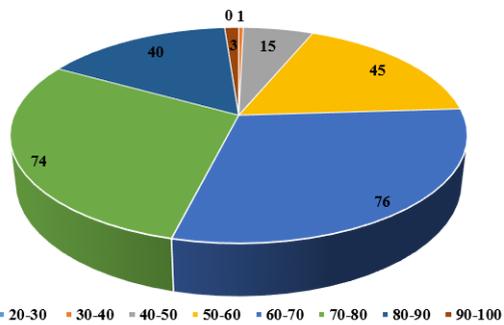


Fig. 3. (b) Male patients with thrombotic cerebral infarction from 2017, by age category

Figure 3 (a,b) displays the incidence of thrombotic cerebral infarctions by gender and by age category (10 years old), for 2017. As depicted in Figure 3 (a), the highest incidence of thrombotic cerebral infarction in females was recorded in the category 70-80 years old (88 patients), thus very close to the categories of 60-70 years old (64 patients) and to the category 80-90 years old (61 patients). Concerning males, according to Figure 3 (b), most thrombotic cerebral infarctions occurred in the age category of 60-70 years old (76 patients), closely followed by the category de 70-80 years old (74 patients). A significant number of cases were also recorded in the age category of 80-90 years old (40 patients).

As age decreased, namely 50-60 years old, fewer cases were recorded (34 women, 45 men), in the category 40-50 years old (14 women, 15 men), in the category 30-40 years old (5 women, 1 man). Fortunately, the category 20-30 years old did not record any thrombotic cerebral infarction in 2017.

Conclusions

Consequently, it may be stated that this study represents a depiction of thrombotic cerebral infarctions in the region of Moldavia, which helped us acquire an overall image regarding the incidence of this disease.

From our perspective, it is important to monitor this phenomenon in the future, in order to deduce whether the rate of thrombotic cerebral infarctions has an ascending or a descending trend. A continual monitoring of the phenomenon will also enable us to point out the variations or changes concerning the age categories recording strokes.

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The Influence of Adapted Sport Activities and Performance Sport on Spirometric Values for Children and Adolescents with Visual Impairment

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Abstract

The aim of this study was to investigate and determine the differences on functional capabilities on the respiratory system for children and adolescents with visual impairment who are not practicing sport and who are practicing sport at different levels. Forced vital capacity (FVC), Forced expiratory volume in 1 second (FEV1), peak expiratory flow (PEF), maximal voluntary ventilation (MVV), Tiffeneau Index, were measured in 50 visually impaired children and adolescents aged between 9 and 19. 11 of the participants don't practice sport at all, 31 practice sport at least twice a week for 50 minutes and 8 practice performance sport (9 trainings per week, lasting 120 minute for a session)

Physical activity level was measured with the Physical Activity Index. FVC is statistically lower $p \leq 0,01$ for the visually impaired who are not practicing sport. FVC is statistically higher $p \leq 0,01$ for visually impaired who are practicing sport at a high performance level comparative with the whole group and exceeds the normal predicted values. FEV1 and PEF is significantly higher $p \leq 0,01$ for visually impaired who are practicing sport regardless of the performance level. MVV showed high levels only for the visually impaired who are practicing high performance sport. ($p \leq 0,01$). Tiffeneau Index values are normal for all the participants in the study. The participants in the study were recruited from a local school of visually impaired children from Cluj Napoca and the sport activities they practice are: torball, goalball, tandem biking, swimming and athletics. The high performance sport practiced by the 8 participants was swimming, the subjects were members of the national Paralympic swimming team.

Keywords: spirometric values, visual impairment, adapted sport, performance sport

Introduction

In October 2017 WHO published a statistics witch estimate that more than 253 million people worldwide suffer from visual impairment with 36 million of blinds and 217 million people with low vision.

According to recent literature, visually impaired children show deficits in their motor development (Haegele, Brian & Goodway 2015, Levztzion–Korach, Tennenbaum, Schnitzer, & Ornoy, 2000). Even a minimal loss of vision is significant because this sensation is directly related to movement, attitude, ability to co-ordinate the hands and personality of each individual (Navarro, Fukujima, Fontes, de Andres Matas, & To Prado, 2004).

Visual impairment and sensory defects result in difficulty in physical movement, efficient movement, and safety concerns for physical exercises (Chen & Lin, 2011).

Visual impairment affects motor development of the individual due to the lack of sensory data input through the visual pathway, resulting in weakness, low cardiorespiratory resistance and physical performance, compared to the performance of standard individuals (Zebrowskai, Gawlik, & Zwierzchowska, 2007).

Blind and visually impaired children and adults have low levels of physical activity and are considerably less active compared with the general population (Holbrook et al., 2009; Marmeleira et al., 2014).

Individuals with visual impairment have consistently exhibited lower physical fitness and physical activity levels than the properly sighted children, youth and adults (Aslan et al., 2012; Marmeleira et al., 2014).

Children with visual loss suffer from sensory impairment that limits their engagement in physical activity. (Craft, 2000, Sonksen, Levitt & Kitsinger, 1984)

Low motor development, weaker movement coordination, hypotonicity, and a decrease of spirometric variables

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have also been observed (Wiegersma & Vander Velde, 1983).

Many visually impaired individuals do not voluntarily participate in sport activities.

The benefits of physical activities are multiple, from social to physical and psychological improvement. (Maniu 2015)

The level of physical fitness for the visually impaired is generally lower and frequency of obesity is higher compared with the general population (Greguol et al., 2014).

The aim of this study was to investigate and determine the differences on functional capabilities on the respiratory system for children and adolescents with visual impairment who are not practicing sport compared to those who are practicing sport at different levels and the differences between those who are practicing sport at high performance level and the rest of the group.

We also wanted to know if these values are closed to predicted/ standard values according to age, gender and weight.

Material and Methods

Study Group

The study included 50 visually impaired children, 23 female and 27 male. The age of the participant was 13.48 ±3.019 years.

The children were enrolled in a special school for visually impaired children.

11 of them did not practiced any kind of sport, 39 were practicing sport at different level (8 of them were practicing high performance sport (9 trainings per week, lasting 120 minutes per session) they were members of the National Paralympic swimming team. The sport activities they practice: torball, goalball, tandem biking, swimming and athletics.

Measurements

Spirometry

The following device was used in order to assess Forced vital capacity (FVC), Forced expiratory volume in 1 second (FEC1), peak expiratory flow (PEF), maximal voluntary ventilation (MVV), Tiffeneau Index: MIR Spirobank II Spirometer, S/N 000912.

The recorded values are registered and presented as a percentage of the standard value given by the device according to age, gender and weight.

The respiratory function tests were administered by the same technician after the child had been habituated to the spirometer for 10 minutes.

Physical Activity Index

Physical activity index is calculated by multiplying physical activity frequency, intensity and duration. To generate positive effects in terms of health, a physical activity must be performed frequently, must last enough time (not less than 20-30 minutes, but not much more than the exercising level or phase) and must engage as many muscle groups as possible, at an appropriate level of intensity.

Score Rating Characterization, Physical condition category: 80-100 very active superior lifestyle, 60-80 active and healthy person, very good, 40-60 acceptable reasonable, 20-40 insufficiently active, relatively sedentary, 20 very sedentary

We completed the questionnaire with the type of sport they were practicing.

Statistical analysis

The statistical analysis was performed with the MedCalc Statistical Software version 18.10.2 (MedCalc Software bvba, Ostend, Belgium, <http://www.medcalc.org>, 2018). The data was described by mean and standard deviation. Comparisons between groups were performed with the T test for independent variables. The value of p <0.05 was considered statistically significant.

2.1. Mean functional values on the respiratory system for the group

Table 1. Mean values for all participants

Functional values on the respiratory system	mean	Std deviation
FVC	74,88 %	22,846
FEV1/FVC (Tiffeneau Index)	106,80 %	5,7644
FEV1	80,80 %	23,208
PEF	70,12 %	15,738
MVV	76,98 %	24,490

Forced vital capacity (FVC)

The mean baseline values represented 74, 88 % of the predicted forced vital capacity, with a minimum value of 38% and a maximum value of 133%. The mean values recorded were 25.12% lower than the expected values related to age, gender and height of subjects.

Forced expiratory volume in 1 second (FEV1)

The mean baseline values represented 88, 80 % of the predicted forced expiratory volume in 1 second, with a minimum value of 48% and a maximum value of 144%. The mean values recorded were 11.2% lower than the expected values related to age, gender and height of subjects.

Peak expiratory flow (PEF)

The mean baseline values represented 70, 12% of the predicted peak expiratory flow in 1 second, with a minimum value of 39% and a maximum value of 107%. The mean values recorded were 29, 88% lower than the expected values related to age, gender and height of subjects.

Maximal voluntary ventilation (MVV)

The mean baseline values represented 76, 98% of the predicted maximal voluntary ventilation, with a minimum value of 30% and a maximum value of 146%. The mean values recorded were 23, 02% lower than the expected values related to age, gender and height of subjects.

2.2. Mean values for Physical Activity Index for the group

Table 2. Mean values for all participants Physical Activity Index

<i>Physical Activity Index</i>	mean	Std deviation
Mean values	65,92	29,56

The maximum score for the Physical Activity Index is 100 points, which means that in our group the mean values are 65, 92% from the maximum possible score.

The maximum score in our group was 100 points and the minimum was 20 points.

2.3. Functional values on the respiratory system. Comparison between those who practice sport and those who are not practice sport

Table 3. Mean values for all participants for functional values on the respiratory system. Comparison between those who practice sport and those who are not practice sport

	Practicing sport N 39		Not practicing sport N 11		Difference significance
	mean	Std deviation	mean	Std deviation	
FVC	81,56%	21,10	51,18 %	8,58	p≤0,000
FEV1/FVC (Tiffeneau Index)	106,85 %	5,64	106,64 %	6,47	p≤0,916
FEV1	87,67 %	21,30	56,45 %	8,85	p≤0,000
PEF	73,72 %	15,03	57,36%	11,21	p≤0,002
MVV	80,18 %	25,80	65,64%	15,08	p≤0,082

Forced vital capacity (FVC)

Mean values for the sport practicing participants are 81, 56 % from predicted values, for the not practicing sport participants 51,18 %.

We observe a statistically significant difference p≤0,000 between the two categories.

Tiffeneau Index

Mean values are in the limits of normal

Forced expiratory volume in 1 second (FEV1)

Mean values for the sport practicing participants are 87, 67 % from predicted values, for the not practicing sport participants 56, 45%.

We observe a statistically significant difference p≤0,000 between the two categories.

Peak expiratory flow (PEF)

Mean values for the sport practicing participants are 73, 72 %from predicted values, for the not practicing sport participants 57, 36%.

We observe a statistically significant difference p≤0,002 between the two categories.

Maximal voluntary ventilation (MVV)

Mean values for the sport practicing participants are 80, 18 % from predicted values, for the not practicing sport participants 65, 64%.

We observe a statistical difference $p \leq 0,082$ between the two categories.

2.4. Mean values for Physical Activity Index. Comparison between those who practice sport and those who are not practice sport

Table 4. Physical Activity Index. Comparison between those who practice sport and those who are not practice sport

Physical Activity Index	Practicing sport N 39		Not practicing sport N 11		Difference significance
	mean	Std deviation	mean	Std deviation	
Mean values	78,46	19,66	21,45	4,82	$p \leq 0,000$

The mean values for the sport practicing participants are 78, 46 for the not practicing participant are 21, 45.

We observe a statistically significant difference $p \leq 0,000$ between the two categories.

2.5. Functional values on the respiratory system. Comparison between those who practice high performance sport and the rest of the group

Table 5. Functional values on the respiratory system. Comparison between those who practice high performance sport and the rest of the group

Physical Activity Index	Practicing high performance sport N 8		The rest of the group N 42		Difference significance
	mean	Std deviation	mean	Std deviation	
FVC	114,75 %	12,06	67,29 %	15,15	$p \leq 0,000$
FEV1/FVC (Tiffeneau Index)	106,95 %	5,76	106,00 %	6,09	$p \leq 0,673$
FEV1	119,75 %	15,36	73,38 %	15,84	$p \leq 0,000$
PEF	83,00 %	8,55	67,67%	15,65	$p \leq 0,010$
MVV	100,25 %	23,74	72,55 %	22,24	$p \leq 0,002$

Forced vital capacity (FVC)

Mean values for the high performance sport practicing participants are 114, 75 % from predicted values, for the rest of the group 67, 29%.

We observe a statistically significant difference $p \leq 0,000$ between the two categories.

Tiffeneau Index

Mean values are in the limits of normal

Forced expiratory volume in 1 second (FEV1)

Mean values for the high performance sport practicing participants are 119, 75 % from predicted values, for the rest of the group 73, 38%.

We observe a statistically significant difference $p \leq 0,000$ between the two categories.

Peak expiratory flow (PEF)

Mean values for the high performance sport practicing participants are 83, 00 % from predicted values, for the rest of the group 67, 67%.

We observe a statistically significant difference $p \leq 0,010$ between the two categories.

Maximal voluntary ventilation (MVV)

Mean values for the high performance sport practicing participants are 100, 25 % from predicted values, for the rest of the group 72, 55%.

We observe a statistically significant difference $p \leq 0,010$ between the two categories.

2.6. Physical Activity Index. Comparison between those who practice high performance sport and the rest of the group

Table 6. Physical Activity Index. Comparison between those who practice high performance sport and the rest of the group

Physical Activity Index	Practicing sport N 39		Not practicing sport N 11		Difference significance
	mean	Std. deviation	mean	Std. deviation	
Mean values	100	0,00	59,43	27,83	p≤0,000

The mean values for the sport practicing participants are 100, for the rest of the group are 59, 43. We observe a statistically significant difference p≤0,000 between the two categories.

Discussion

Visual impairment has a great influence upon the motor development resulting in hypotonicity, lower cardiorespiratory, and physical performance. (Levtzion-Korach, Tennenbaum, Schnitzer &, Ornoy 2000)

Lack of sensory input also can affect respiratory function of visually impaired children. Decreased muscle strength and chest mobility result in poorer spirometric values in blind children and adolescents (Sonksen, Levitt & Kitsinger 1984, January, Robinson, Scott & Kinnis 1975, Scranton, Clark & McClosky 1978).

In a study vital capacity was find to be higher for the visually impaired participants who are active in sport in comparison with sedentary visually impaired participants. (Mehmet, Seydi & Murat 2017)

Our study carried out to compare sedentary visually impaired children and adolescents and sport practicing visually impaired children and adolescents.

The mean functional values on the respiratory system for the whole group were significantly lower than the standard/predicted values according to age, gender and height of the participants for FVC 78, 88%, FEV1 80, 80%, PEF 70, 12 %, MVV 76, 98%.

Physical activity is positively associated with lung function in lung healthy subjects. (Luzak et all 2017)

Sustained physical activity leads to adaptive changes in respiratory function values. (Tijana at all 2017)

Visual impairment does not limit the effect of training in development of aerobic and anaerobic capacity in blind athletes. (Kamelska, Mazurek & Zmijevski 2015)

The effects of an aquatic therapy program on vital capacity are positive, leading to improved vital capacity. (Maniu 2013)

After caring out these study we observed that visually impaired children and adolescents who are practicing high performance sport can have similar or even higher values than the standard/predicted values according to age, gender and height for FCV 114,75% , FEV1:119,75%, PEF 83,00%, MVV 100,25%.

But in the same time we observed that for those visually impaired children and adolescents who practice sport once or twice a week is not enough to reach normal, predicted values for the functional values on the respiratory system: FVC 81, 56%, FEV1 87, 67%, PEF 73, 72%, MVV 80, 18%. In our study participants attended adapted sport lessons ones or twice a week such as torball, tandembikeing, athletics and swimming.

Similar studies can be done for specific sport branches practiced more than twice a week to follow the effect on the functional values of the respiratory system.

Visually impaired children and adolescents who are not practicing sport at all have much lower values than the standard/predicted values according to age, gender and height for: FVC 51, 18%, FEV1 56,45%, PEF 57,36%, MVV 65, 64%.

There are reports showing that blind children engaged in regular exercise demonstrate greater mobility of the chest and increased strength of the respiratory muscles resulting in an improvement of vital lung capacity and maximum lung ventilation. (Shepard 1990).

We observed that visually impaired participants who practiced sport at different level had higher values than those who are not practicing any sport for FEV (v p≤0,000), FEV1 (p≤0,000), PEF (p≤0,002), MVV (p≤0,082).

The participants who practiced high performance sport showed higher values than the rest of the group for FEV (v p≤0,000), FEV1 (p≤0,000), PEF (p≤0,010), MVV (p≤0,002).

In a study, the physical activity levels of 49 visually impaired children on weekdays and at the weekend were compared using a physical activity diary and it was reported that light activities were usually done on weekdays, taking part in moderate activities was at the weekend and vigorous activities were never done (Aslan, Kitis, Aslan, & Calık, 2004).

In another study, low vision and blind children and adolescents were found to participate in light and moderate activities and there was little or no participation in vigorous activities. (Ummuhan, Bilge Ali 2012)

Houwen et al. (2009) compared participation in moderate and vigorous physical activities between healthy and

visually impaired elementary school children and adolescents, they found the activity level of visually impaired children and adolescents to be lower than that of healthy counterparts.

Other studies showed that physical activity levels of visually impaired children and adolescents are lower than those of healthy children and adolescents and in addition, they were reported not to take part in vigorous activities in physical activity lessons (Houwen et al., 2009; Lieberman & McHugh, 2001; Longmuir & Bar-Or, 2000; Longmuir, 1998; Sit, Linder, & Sherril, 2002).

In our study the Physical Activity Index shows that visually impaired children and adolescents who practice sport are in the *active and healthy person, very good lifestyle category*: 78,46% from the maximum values, those who practice high performance sport are in the *very active superior lifestyle category* of the Physical Activity Index: 100 % . Those who are not practicing sport at all have 21, 45 % from maximum values showing *insufficiently active, and relatively sedentary lifestyle category*.

Conclusion

Visually impaired children and adolescents have lower respiratory values.

Sedentary visually impaired children and adolescents have lower respiratory values than those who are practicing sport once or twice a week.

Even if visually impaired children and adolescent practice moderate intensity sport once or twice a week is still not enough to reach standard/ normal respiratory values. Still there is a remarkable difference between them and sedentary visually impaired children and adolescents.

Visually impaired children and adolescents who are practicing high performance sport have normal and even higher respiratory values.

Sedentary visually impaired children need to be encouraged to participate in sport activities.

In order to achieve normal respiratory values visually impaired children should practice sport more than one or twice a week.

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The Evolution of the School Curricula in Physical Education and Sports Discipline in Middle School (Gymnasium) – Expression of the Reform of the School Curricula

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Abstract

The adaptation of the Romanian education to the standards imposed at European level requires a reassessment of the official documents – developed or elaborated at ministerial level - and which guide the whole teaching process. Both at the curriculum level and, as well as regarding the school curricula, the curriculum reform has produced visible changes, both related to the form and to the content. The present paper aims to make a comparative analysis of three distinct sets of school curricula to the physical education discipline – for the years 1999, 2009, 2017 - in order to highlight the common issues and especially to capture the new information, adapted to the needs of movement in the pubertal stage and which are designed to facilitate the development of motor skills at this critical age. Since the number of physical education hours - in the common core curriculum - did not fluctuate greatly from one stage to another, with two weekly lessons being constantly allocated, the choice and programming or scheduling the most appropriate contents and learning activities within the lesson may be the only option in achieving the course aims of the discipline, for the whole cycle but also differentiated, by years of academic study.

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Keywords: school curricula, adaptation, general and specific competences, objectives, curricula/school curriculum, contents.

Introduction

The school curricula are elements of the formal / official / basic or explicit curricula, together with: the ideal and objectives/course aims of the education system on different training cycles, the framework plans, the methodological guidelines for programs implementation, the textbooks and specialized books, the assessment tools used - that is the entire complex of school documents developed and provided by the Ministry (Colibaba, 2007:55).

The school curricula to the physical education discipline have a decisive role in achieving the didactic design - action completed with the elaboration of the main planning documents for each teacher. They provide the scientific basis and the effectiveness of the didactic approach, in the triad of the teaching actions, assimilation of the pupil's knowledge and their assessment, during each year of academic study. The dynamic nature of these documents refers to periodically updating them, action which is correlated with the new requirements of the educational system, with the necessity to adapt the training of the pupils to the conditions and the existing standards on the labour market.

At the physical education discipline, the school curricula in force effectively and rationally combines the concentric type programming with the linear type (Cârstea, 2000, quoted by Rață& Rață., 2008:22).

The characteristic or feature of concentric programming refers to the repetitiveness of the fundamental planned contents elements, which are resumed from one year of study to another - for example, the skills / movements that define the technique of a sports game or the forms of manifestation of the motor skills – in order to assimilate and master them at an appropriate level.

The programming of linear type refers to the progressive addition of new contents from year of study to another, in order to diversify what has been taught and to provide more and more complex challenges, meant to facilitate adaptations superior to effort, in accordance with the biological and motor age of the pupils (Epuran &Marolicaru 2002; Stanescu, 2013; Talaghir&Iconomescu, 2018).

The evolution of physical development and the manifestation of motor skills at puberty - with profound anatomical - functional changes and highlighting the differences between girls and boys, aspects that impose differentiated

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treatment - materialize in contents of the specialized curriculum divided by sexes or gender, especially those belonging to the acrobatic gymnastics.

Unlike the curriculum/programs intended for practical sports training in various sporting disciplines - where the contents are more reduced, but strictly specialized, extremely complex and at a superior or high level of exigency, for example athletics, sports games etc. – the physical education and sports curricula/programs are accessible and very diversified in terms of contents, addressing - depending on the year of their occurrence - all the components of the physical education model, corresponding to the respective age: harmonious physical development, organizational capacity, skills and motor abilities, alternative sports branches, etc.

The objectives or course aims pursued at the level of the discipline appear stipulated in the curriculum under different formulations, depending upon the year of their publishing/ editing. The older curricula / 1999 are thus structured by frame / cycle objectives and reference / year of academic study objectives, which are currently being replaced by general competences and specific ones, in accordance with the school curricula from 2009 (School Programs grades V-VIII, Physical Education, MEN, 2009), respectively 2017 (School curriculum for physical education and sports, grades V-VIII, MEN, 2017).

Methods

The following research methods were used: the study of the specialty literature, by insisting on the analysis of the framework plans and the new school curricula and of the already abolished ones, the graphical and tabular method, according to the references sources. By the comparative analysis of the design and structuring of the school curricula – to the physical education and sports in middle school (gymnasium) - there can identified the proposed novelty elements and how they can correspond to the pupils' motoric needs or necessities at puberty, or they can foster the improvement of the didactic process.

2. School curricula in physical education and sports discipline - past and present

The detailed study of the three distinct sets of school curricula allowed the identification of the common aspects and the notes of distinction or differentiation between them, with the schematic presentation of their structure in figures 1, 2 and 3.

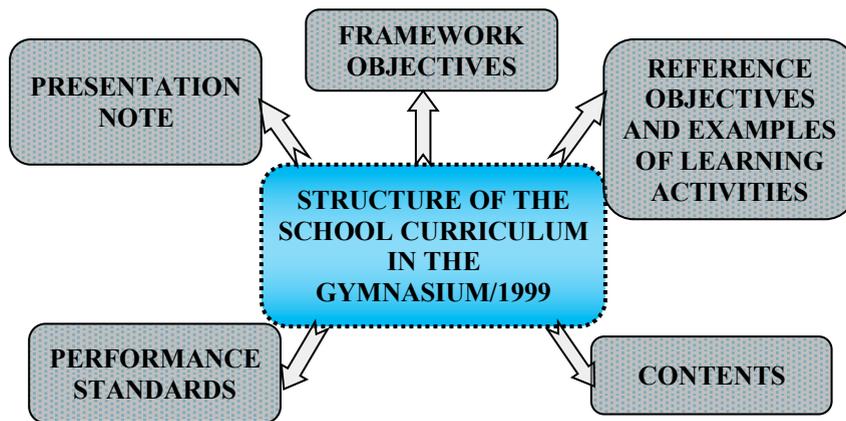


Fig. 1 – Indicators of the school curriculum for physical education and sports/1999

The presentation note for the 1999 curriculum (School curricula for grades V-VIII, curriculum area of physical education and sports MEN, 1999) it informs about the possibility of the achievement of individualized trainings of the pupils and about the fact that conditions are created for the educational establishments to be able to develop their own curriculum. It insists upon adopting some hourly schedules or timetables in order to facilitate the de-mixed training and the optimal capitalization of the school's facilities, and the approach of the specific contents of a seasonal sport is going to replace the branches of sport planned for that respective time interval. Even though this curriculum is currently being abolished, it is an important milestone in the history of the curricular reform, for the physical education and sports in schools.

The framework objectives presented have a general character in the forms are course aims or goals reached at the end of the cycle and derive directly from the general objectives of physical education and sports. They mainly target/focus on health maintenance, developing the general motor skills, developing motor skills related to the taught sporting branches and sports events, favourable influences upon the personality profile - as a premise/prerequisite for a viable or sustainable social integration.

The reference objectives materialize for each year of study the framework objectives - of which they also derive from. They are accompanied by one or more examples of learning activities, which exemplify the actual way of practicing, in order to accomplish them. Example: at the level of the VI th grade, to the reference objective - The pupils must adopt a correct position of the body in all circumstances - correspond several examples of learning activities, among which there is the maintenance of the correct posture of the body during exercising.

The contents of the curriculum are focused on the following thematic and non-thematic components: organizational capacity, harmonious physical development, basic motor skills, basic motor abilities, applicative utilitarian and sports from athletics, gymnastics and sports games, and alternative sports branches. It should be noted that it is possible to teach a single sports game and keep it or maintain it throughout the cycle, aspect which is cancelled in future curricula. Another element which cancelled by the current curricula/ 2017 is the possibility of evaluating the pupils from separate elements belonging to the sports game and to the acrobatic gymnastics, but the maximum mark that could be obtained - for this case - was 8 for the game, respectively 9 for the gymnastics. Another aspect which is no longer found in the new curricula/2017 was the possibility of approaching the additional contents - written in italics and provided/featured with * - in the expansion type classes, granted in the curriculum at the school's decision, thus the pupils received an additional hour of physical education, in order to scroll all the contents, selected by the teacher from the curricula.

The performance standards are another element removed from the curricula in force. They accompanied each frame objective and indicated its degree of achievement. Example: to the framework objective; the development of the overall motor capacity of the pupils, necessary for the performance of the sports activities it corresponds the performance standard Achieving the optimal indices of the speed of movement, endurance and strength of the main muscular groups.

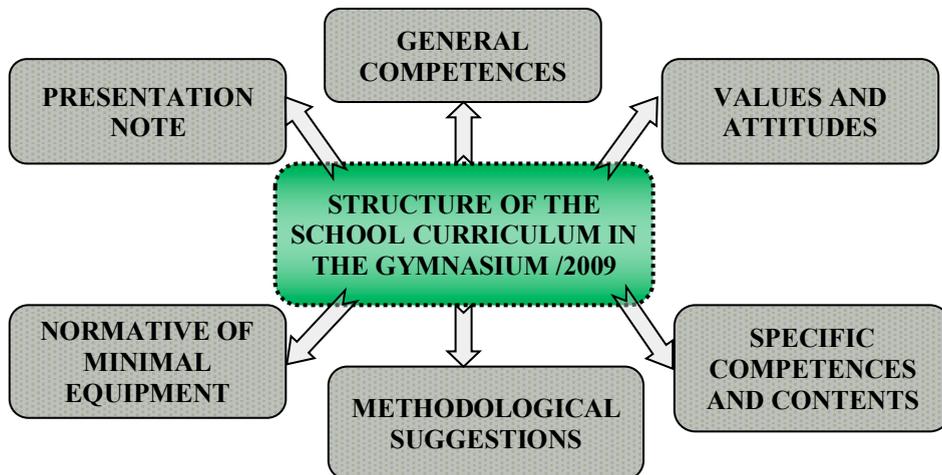


Fig. 2 – Indicators of the school curriculum for physical education and sports /2009

The Presentation Note – for the 2009 curriculum (School Programs grades V-VIII, Physical Education, MECI, 2009) indicates the fact that it makes the transition from framework objectives and reference objectives to the competence-centred educational model, in accordance with the recommendations of the European Parliament, and this aspect favors or promotes the opportunity to learn it all along the ontogenetic evolution.

The General Competences define set of skills or abilities, knowledge, attitudes and skills that are useful for personal development, social integration, and accessibility to the labour market. Having a high degree of generality, they can only be reached at the end of the training cycle, as a collection of favourable influences on multiple plans or in many fields, generated in the physical education lessons. Example: Using and capitalizing the specialized information, the means and methods which are specific to physical education and sports, aiming favourable influences upon the health and harmonious physical development.

The Values and Attitudes represent another novelty element of the curriculum, and they are fixed components that define the type of personality, and which can be transferred to everyday activities. Examples: interest in school and extracurricular physical activities, obeying/adherence to rules of organizing and conducting competitions, availability of collaboration with other colleagues and the teacher, etc.

The Specific Competences and contents for each academic year of study are associated, thus lacking the learning activities for the achievement of each skill/competency, these being mentioned / written to the end of the curricula, in the category of methodological suggestions. The following novelties or news appear for the content of the curricula:

- Teaching a sports game in the 5th grade, then two games in the 6th grade - the one in the previous year and a new one, only the new one in the 7th grade and one at your choice in the 8th grade. For this reason, the school curricula provide contents for sports games only for 3 years of training.
- Teaching torball and goalball contents for the ones who are short-sighted / cecity.
- Providing some new headings, related to individual protection and personality traits development.
- Basic motor skills and applicative-utility are replaced / replaced by locomotion, handling and stability ones.
- Oina moves from the alternative sporting branches to sports games.
- New branches of alternative sports appear, such as: cycling-tourism, sports dance, folk dance, sports orientation, chess, rugby-tag, table tennis, jogging and korfbal

The methodological suggestions make direct reference to the exemplification of learning activities - necessary in order to achieve skills/competences, to the requirements that must be met for the optimization of the didactic act: the medical certificates, the location of the lessons development, the sports equipment, the specification of the evaluation criteria, the necessity of the predictive and the formative / continuous evaluations, the importance of progress in the grading process, etc.

The Normative of minimal equipment specify the limit equipment/endowment with equipment, installations, machines, equipment and sports materials, for each education unit or establishment, in order to ensure the conditions for carrying out the activities specific to the field.

The last gymnasium school curriculum - developed this year and with effect (in force) starting from the fall of 2017, for the 5th grade, the rest of the classes completing the gymnasium cycle on the basis of the 2009 curriculum - brings a number of changes, especially at the level of the evaluation system. The first novelty is that all the classes have 2 mandatory common core hours, including the 8th grade, where the previous framework plans mentioned only one hour. This aspect is mentioned in the presentation note and confirmed by the new framework plan for gymnasium education, according to OMENCS no. 3590, from April 5th, 2016. Another new aspect or issue refers to the disappearance of asterisk contents for the extension type classes, and providing classes in the curriculum at the school's decision is made only by optional disciplines.

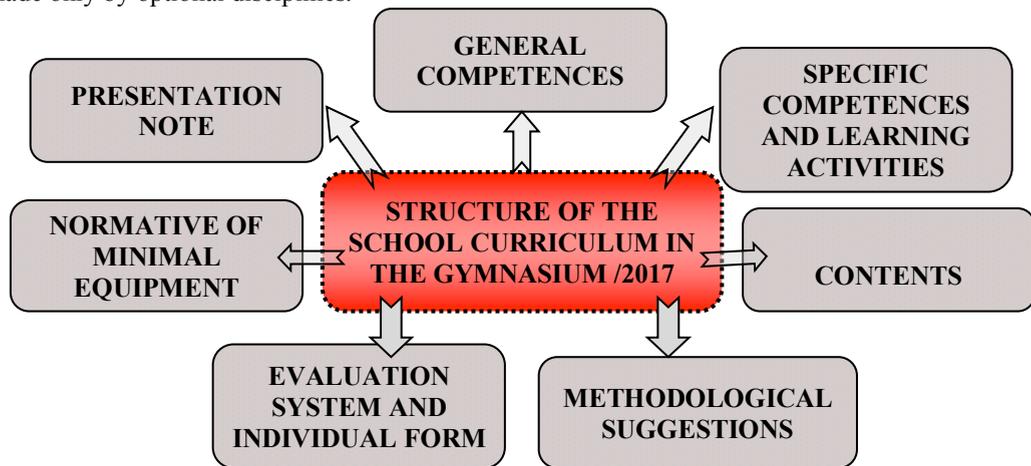


Fig. 3 – Indicators of the school curriculum for physical education and sports /2017

The General competences are reduced numerically / condensed as information as compared to the ancient/former curriculum, and the specific ones have directly associated examples of learning activities, similar to the new primary education curricula, thus ensuring a logical continuity in structuring these curriculum documents. The existing values and attitudes disappear in the ancient/former document.

The contents are similar to those in the ancient/former curriculum, but their successive presentation in the table, for all the grades, allows the notification of new elements that appear on an annual basis and those that are no longer

approached, which allows a better image/ bird's eye view upon the gradation of elements and themes, that are going to be planned from one year of academic study to another.

The methodological suggestions refer to:

- The teaching act will shift from focus to content transmission to activities focusing on learning experiences.
- The accessibility and attractiveness of the planned themes will be ensured by using competitions /contests as one of the basic forms of organizing activities.
- Working on value groups and pairs provides higher motor density and promotes pupil collaboration.
- The contents of the Organizational Capability and Harmonic Physical Development can be approached as distinct themes of the lesson in the first weeks of school, although they have links with own destination, and the theory and methodology of the field considers that the lesson themes are addressed only by skills and motor qualities.
- Engaging the themes in motor skills and motor habits requires that it will be designed so that the movements / skills can be more easily assimilated and strengthened as a result of the favourable influence of the motor qualities.
- A priority of the teaching staff is the selection and adaptation of the taught content to the pupils' motor potential and the material conditions existing in the school.

The evaluation system - presented in the curriculum (School curriculum for physical education and sports, grades V-VIII, MEN, 2017) brings the most up-to-date news/novelties in this official document, although the former evaluation system is a separate document from the school curriculum and valid for all the training cycles. Its new elements refer to:

- The assessment of harmonious physical development occurs by executing a complex of free exercises or exercises with objects, executed on 8 steps, identical in number to that class. Consideration is given to: the quality of the execution technique, the correct order, the rhythm and the expressiveness of the movements.
- The evaluation rating of speed is 10x5 meters that replaces the 5x10 meter from the old system, thus requiring more agility - the element of coordination - by the large number of directional changes needed to navigate the route. The 50 meter sprint test is used as usual.
- The strength assessment of the large regions and muscle groups - upper limbs, lower limbs, abdomen, and trunk - is much more diverse, with three different groups being evaluated - with one exercise each - in the fifth grade, reaching all four regions - with two exercises for each, in the eighth grade. Unlike the old system, the exercises for each region and the scale for grade 5 are not specified, only the fact that there are evaluated the correctness and the volume, respectively the intensity of the execution.
- In the assessment of the resistance, the clearly marked distance runs - 600, 800, 1000 meters - are replaced by 4-minute running, measuring the distance travelled and quantifying it in the mark. The scoring criteria for this variation are also new: 50% running continuity, 25% performance and 25% initial test progress.
- In addition to jumping on a gymnastic apparatus in the program - where the best performance is scored from two attempts - the assessment of acrobatic gymnastics cannot be done by separate elements; the pupils are required to perform an exercise composed of several elements taught, with a number of elements equal to the class they are in.
- For sporting games, it is cancelled the possibility to issue marks only for separate technical elements, but only through technical structures / elements binding - in grades V-VI - and exclusively by bilateral sports - for grades VII-VIII. The mark given for the execution of the technical structure expresses the correctness of the execution, the accuracy of the completion, the fluency and the speed of execution. The mark awarded for the bilateral game will highlight the offensive and defensive phases, the compliance of the tasks in the respective position, the collaboration with the teammates, the compliance with the rules of the game, etc.
- They also appear in the assessment and measurement of the biomotor potential of the school population, made up and then centralized at national level in pilot school units, including a series of Eurofit battery tests. The anthropometric measurements refer to: waist / body height, body mass / body weight, foot / foot sole length, width / opening of arms, bust value, chest perimeter in respiratory rest, forced inspiration and forced expiration, abdominal perimeter in respiratory rest, basin perimeter and the biacromial diameter. Biomotor measurements refer to:
 - testing the lumbar flexibility - sitting with the soles supported by the edge of the gym bench;
 - long jump from standing position, to assess jumping height / explosive force of lower limbs;

- lifting the trunk from dorsal laying for 30 seconds with flexed knees and feet fixed to the fixed ladder to assess the dynamic abdominal force as endurance;
- throwing the oina ball from standing still or dynamic, to assess the explosive force of the dominant superior member;
- the Flamingo balance test for 60 seconds on a 4 cm height, 3 cm wide and 50 cm long board;
- Maintain hanged position with the chin over the bar, the palms grasping lower / supination lock for the assessment of the isometric force in endurance mode;
- tapping test / touch plates, 25 cycles / 50 touches of the discs, to evaluate the rewinding speed and hand eye coordination;
- 50 meters running with standing start, for the evaluation of speed;
- Relay 10x5 meters, for agility and speed under coordination;
- Running for 4 minutes, measuring the distance travelled.

The novelty of the study results from the reference element dynamics analysis belonging to the national secondary school physical education curricula in the context in which the whole teaching activity must be pupil-centred, focused on the formation of transferable and useful skills and abilities in long-term daily activities, and avoid the approaches focused only on the assimilation of some notions, without being able to use them concretely in the practical activity. The need to change the curricula is explained by the need to harmonize them with the education requirements at a European level. Even if new official documents are important in order to change the approach to physical education lessons, problems arise regarding the availability and ability of teachers to creatively adapt learning activities and link them directly to the planned content. Several physical education teachers in pre-university education have highlighted - in discussions that took place during demonstrative lessons or during the exams taken for obtaining teaching ranks - that, in reality, only the official documents and the writing form of the planning documents are changed, but that the practical activity during PE classes has not undergone any important change. The causes are multiple: becoming jaded over the years, poor communication with pupils, stereotyped planning of the same exercises to influence physical training, of the same types of exercises used for harmonious physical development, of the same teaching methods for learning sports technique as 20 years ago and so on. The information explosion made available by the Internet is not being exploited, which would allow PE teachers to vary and diversify the teaching systems used by consulting, critically taking over and adapting the exercises and the movement games included in PE classes held in other EU countries. Regardless of the changes made to school documents, if they are not accompanied by the reintroduction of the teacher training courses, in which the teachers who have already obtained the teaching ranks, will be motivated to adopt the new methods used in other European systems and if they are not applied in order to see the pupils' response to new exercises, the teaching-learning-evaluation process itself cannot progress.

There has been heavy criticism regarding the 1999 curricula due to the emphasis laid on the transmission and learning of too much content, regardless of its future practical utility, instead of shaping certain movement skills. The problem has been solved by means of the 2009 curricula (MECI, 2009) that focus on skill and ability formation - but they are criticized by many teachers because they have a major drawback, that is, they do not allow the sports game to be taught throughout the cycle of studies, fact which does not allow the exploitation of the equipment or of the material resources, thus reducing the chances of increasing the technical and tactical level in this direction. In the case of the 2017 curricula (MEN, 2017) which took into account the views of physical education teachers, as being expressed at the level of the county school inspectorate - there are still some queries about a number of issues: the lack of clear/standardized trials in order to assess strength for more muscle groups - which are left at the discretion of the teacher and of the pupil, a clear national assessment scale and the difficulty in assessing performance for endurance testing - the distance covered within 4 minute-running is measured, unlike the old system (National evaluation system for physical education and sports, MEN, 1999), where the time from a standard distance running was measured.

The limits of the study are due to the impossibility of questioning a representative number of secondary school teachers at a national level, cumulated with the lack of centralization of their opinions, regarding the quality of the curricular reform in education, highlighting the deficiencies and the advantages resulting from the implementation of these official documents for PE, aspects that can make up the directions of more complex future research. Another research direction - derived from the present paper - is related to the identification, on the one hand, of how pupils perceive the usefulness and effectiveness of the new curriculum and, on the other hand, of the related assessment system, in terms of a favourable evolution of general motor skills and of the specific sport branches taught.

Conclusions

The evolution of specialized curriculum- for the curriculum area of physical education and sports - indicates visible progress in optimizing and updating the didactic act, in accordance with the current social requirements and aims at harmonizing these official documents with the educational standards at the European level.

An important breakthrough or progress brought by the new curricula is represented by the focus of learning activities on forming skills and competences – and not just on transmitting and assimilating certain knowledge - aspect that facilitates their transfer to solving tasks from independent activities.

Another favourable element of the new school curriculum is given by the diversification of the contents that can be taught - especially at the level of sports games and alternative sporting branches - but also finding some sports branches that can allow the pupils who have sight problems to engage in physical activities.

The diversity of the anthropometric newly introduced tests and measurements allows a better assessment of the pupil's motor ability and physical development. First-time evaluation tests that are part of the Eurofit set are used and these measure previously neglected skills such as static flexibility or static equilibrium.

It is appropriate to adapt the current assessment system - for gymnasium and high school cycles - to the standards and tests required by the new gymnasium system. Anthropometric and biomotor determinations would thus facilitate a continuous and unitary vision of the evolution of motor skills and somatic development of pupils from one year to another and from one training cycle to another.

Establishing a marking/scoring scale, for the new tests proposed to the physical education discipline in gymnasium, by gender and classrooms - would facilitate the quantification of the pupils' results and performance, at a national level.

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Improvement Of Kyphotic Posture Using Physical Therapy And Dancesport Means

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Abstract

Kyphosis is a type of spinal deformity and it is defined as a curvature of the spine measuring 50 degrees or greater on an X-ray, a diagnostic test that uses invisible electromagnetic energy beams to produce images of internal tissues, bones and organs onto film. The normal spine can bend from 20 to 45 degrees of curvature in the upper back area. The purpose of this study was to mitigate this faulty posture using the means specific to kinesiotherapy and dancesport. The subject of this study is aged 7 and he has a kyphotic posture. The exercise routine unfolded for four months, three sessions a week. Each session lasted from 90 minutes, of which 45 minutes were used in order to perform exercises specific to kinesiotherapy, and 45 minutes for movements specific to dancesport. The tests and measurements conducted were as follows: the posturograph, test for evaluating breathing, the Matorin test, the candle test, the measurement of the chest girth during inhalation and exhalation, the measurement of the range of cervical spine mobility. Findings. Upon comparing the findings, we noted an improvement of the kyphotic posture, as such: at the level of the head, a decrease in the values from 5.8 cm initially to 2.6 cm finally; at shoulder level, the value decreases from 3.7 cm to 2.7 cm; at hip level, the value decreases from 5 cm initially to 2.5 finally, and at knee level, from 2.4 cm initially to 0.4 cm. Consequently, it may be highlighted that the kinesiotherapy program associated with the dancesport practices led to positive results, within a short timeframe. Furthermore, besides the muscle toning, the subject acquired the capacity of being aware of his faulty posture, thus managing to correct himself.

Keywords: faulty posture; correction; kinesiotherapy; dancesport.

Introduction

The term kyphosis is used to describe the spinal curve that results in an abnormally rounded back. Kyphosis can occur at any age. 7456 papers were found when the word kyphosis was searched on 'Pubmed' search engine. The majority of these papers studied kyphosis were related with scoliosis. It was understood that kyphosis was studied in addition to the other deformities in the papers related to the etiology and surgery of kyphosis with some exceptional cases.

The sagittal alignment of the spine always changes during the period starting from birth to old ages. The whole spine remains in the kyphotic posture extending from occipital to the sacrum at birth; whereas when one starts standing in the upright posture, first lordosis occurs in the lumbar region and then kyphosis occurs in the thoracic region (Yaman & Dalbayrak, 2014).

The normal spine has curves that develop during growth periods and are influenced by stresses placed upon it during work and activities (Ballinger & Frank, 2003; Wojtys et al., 2000).

The function of these spinal curves is to increase the overall strength of the vertebral column and to help maintaining of the balance in the upright position. They also facilitate to absorb stresses placed on our bodies through impact activities such as running and jumping (Bontrager & Lampignano, 2005). The curves are described as convex (kyphosis) or concave (lordosis) to illustrate the direction of the arch in relation to the hollow or depressed side of the curve (Anderson, 2007).

Hyperkyphosis or increase in thoracic curve greater than normal range is one of prevalent spinal disorders (Shamsi et al., 2014). Biomechanical data suggest that an increase in the thoracic kyphosis may be associated with significantly

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higher spinal loads and trunk muscle force in upright stance and this might accelerate degenerative process which in turn leads to further spinal dysfunction and pain (Briggs et al., 2007).

Thoracic or thoracolumbar spinal kyphosis should be evaluated for any structural abnormalities (eg, congenital or developmental kyphosis); if none are found then it is considered postural in nature. If vertebral body wedging (>5 degrees in at least three contiguous vertebrae) is noted, the patient may be diagnosed with Scheuermann's deformity, which is often associated with irregularity of the vertebral endplates (Sarwark, 2014). In addition to thoracic kyphosis, other postural and morphological parameters can influence the distribution of body mass and therefore the biomechanical environment of the spine (Bruno et al., 2012).

Another factor that interacts with the thoracic kyphosis angle to influence vertebral compressive loading is whether one's posture is "congruent", meaning that the thoracic curvature is proportional to and balances the lumbar lordosis. Congruency is necessary for maintenance of an upright posture, and the degree to which someone's posture is congruent will influence body mass distribution and the biomechanical environment of the spine. An age-related increase in thoracic kyphosis, without a concomitant change in lumbar lordosis, leads to an "uncompensated incongruent posture", where the thoracic and lumbar regions no longer have complementary amounts of curvature and upright posture is therefore diminished. However, as discussed above, it is possible to make a postural adjustment, such as tilting the pelvis back, to stabilize the body's center of mass. When this occurs, the individual will have a "compensated incongruent posture" since some adjustment was made to correct balance and redistribute body mass, but the thoracic and lumbar curves are still not balanced (Knight et al., 2003).

Hovanlu et al. (2009) in a research concluded that by reduction of adductor muscles' power of upper body such as standing and sitting postures in long time, the amount of kyphosis curvature of back will be increased. Alison et al (2007) reported that kyphosis with imposed load on spinal cord has meaningful relationship with weakness of back's muscles and reduction of body activities.

Moradpurayan et al (2012) also showed that among incorrect habits of carrying bag and unequal shoulder and also among wrong habits of sitting at home and Kyphosis there is meaningful relationship (Moradpurayan et al., 2012).

Therefore, it is expected that related responsible people, teachers and experts pay more attention to this case to enter healthy people to the society and also reduction in cost of medicine. As so many of skeletal anomalies are not hereditary and they are grow along the life by life style of people, it should be use from different researches from physical condition of people's society for help to prevent from causes of disorders by correction of movements (Dadban et al., 2013).

For children and adolescents with significant scoliosis or kyphosis, patients and families are encouraged to consider the long-term issues involved in the complex decision-making about intervention with bracing or surgery (Dudas-Sheehan & Grayhack, 2017). The use of a brace has the most proven efficacy to prevent the progression of adolescent idiopathic scoliosis compared to other nonsurgical options, (Negrini et al., 2015), but it may be less effective for kyphosis management. Long-term outcome data support spine fusion treatment in children and adolescents who are surgical candidates, (Smith, 2012), with excellent healing rates (bone fusion) and minimal complication rates.

Female dancers had smaller thoracic kyphosis angles compared with their equivalent track and field counterparts. This equates to the postural requirements of Dance Sport that requires its participants to maintain an elongated back and forward rotated hips that have been reinforced over years of training (Kruusamäe et al., 2015).

Kyphosis in young people can be corrected and there is some evidence to suggest that dance training can be helpful in reducing kyphosis. A group of 26 cross-country skiers (who generally show a higher incidence of kyphosis than the general population) participated in 3 months of dance training and exhibited a reduction in the degree of kyphosis following the dance intervention. Since adult-onset low back pain can sometimes be attributed to kyphosis this study suggests that dance could be a useful intervention in treating low back pain (Warnecke, 2012).

The observation that thoracic kyphosis increases during growth has been reported earlier. Thus, in a study comprising subjects of all ages between 8 and 16 years, Willner and Johnsson measured the sagittal curves using a pantograph (Torulf, 2001).

Thoracic kyphosis increased during growth, but contrary to the results of Willner & Johnsson's study, there were no differences in sagittal configuration between boys and girls at puberty (Willner & Johnsson, 1983).

The results of Bruno's et al. (2012), indicate that in addition to measuring thoracic kyphosis angle, it is also necessary to evaluate overall posture and spino-pelvic alignment when assessing one's risk for degenerative spinal pathology due to altered spine biomechanics, such as vertebral fractures.

In conclusion, there is evidence linking hyperkyphosis of the thoracic spine to vertebral fractures and other spinal degenerative diseases (Bruno et al., 2012).

Material and method

The purpose of this study was to mitigate this faulty posture using the means specific to kinesiotherapy and dancesport.

Certain aspects of embodiment offer kinesiotherapists enormous possibilities for growth. If embodiment is about understanding the reality of being embodied and not just having a body, then physiotherapists, with their unique appreciation for movement and the effect of illness and impairment on function, have a vital and enormously significant part to play in developing a new science of embodied movement (Nicholls, D. & Gibson B., 2010).

No sports activities are contraindicated in kyphosis, because almost all activities involve spinal extension. Sport activities performed in a sitting position like cycling and rowing are indicated in cases of harmonious kypho-lordosis ie hyperkyphosis balanced by hyperlordosis. The position of the spine needs to be controlled. With swimming some styles such as the dolphin and butterfly styles which increase curves in the sagittal plane must be avoided. Sport activities complete physical therapy and in case of conservative orthopaedic treatment, best results are obtained in patients regularly practicing a sport. Hypotonia is physiological in teenagers and sport is one of the best ways to fight against this physiological hypotonia (Mauroy, 2012).

DanceSport competition combines athletic performance and esthetic values (World DanceSport Federation, 2012).

This can be observed within their posture on and off the dance floor. As posture is such a fundamental aspect of DanceSport competition, dancers spend a considerable amount of training developing the appropriate posture and dance hold. This raises the issue as to whether these adaptations are habitual or cause permanent anatomical changes to the spine (Kruusamäe et al., 2015).

The subject who took part in this study is seven; he practices dancesport and he features a kyphotic posture. The exercise routine was applied for four months, three sessions per week. Each session lasted for 90 minutes, of which 45 minutes were used in order to perform exercises specific to kinesiotherapy, and 45 minutes for movements specific to dancesport. They concerned only tango, slow dance, samba and cha-cha-cha, because there four dances out of the 10 within dancesport involve the correct posture that manages to place the thoracic and cervical spine in a hypercorrective stance. The steps used in the recovery program were: Waltz - Closed Natural to Reverse Change, Natural Turn Reverse Turn; Tango: Argentine Tango Walk character; Cha-cha: Closed Basic Movement, New York, Hand to Hand; Samba: Natural Basic Movement, WISKA, Stationary Samba Walks.

The kinetic routine aimed to form the reflex of correct body posture and stance, especially for the spine, to develop the muscle groups with an important role in correct posture; to re-educate breathing; to tone the elongated and atonic muscles at the level of the dorsal spine and of the abdominal wall; to correct the position of shoulder and shoulder blades. Some of the exercises used in physical therapy program were: abdominal breathing exercises for learning and development of respiratory muscle strength; coordination and balance exercises; walking on tiptoe, arms above (to the front and back in the direction of travel); walking on heels, hands caught at the back; walking with the stick resting on the shoulder blades; walking with alternative and simultaneous extension of arms; walking with the flexion of the hip and the knee bended with the trunk extension; side lunge simultaneously with the extension of arms; in prone, hands on your head: extensions of the trunk; in the prone position, horizontal abduction of the shoulders, legs apart: twisting of the trunk to the right and to the left; in supine position, the hands at the back of the neck: flexion of the hip and return slowly to the initial position; in prone resting with stick at the shoulder blades, extensions of the trunk; on the knee, hand support: trunk flexion and extension; standing on the knees and hands: moving forward till the chin is placed on the hands by bending the elbows.

The tests and measurements conducted were as follows: the Global Postural System posturograph, test for evaluating breathing, the Matorin test – for assessing general coordination and balance, the candle test – for the subject's force in inhalation, the measurement of the chest girth during inhalation and exhalation, the measurement of the range of cervical spine mobility in all movement axes (flexion, extension and twist).

Findings

Table 1. Table of the values obtained in the evaluation of spinal range

Spinal range	Initial testing	Final testing
Flexion	32 ⁰	36 ⁰
Extension	47 ⁰	52 ⁰
Rightwards tilt	31 ⁰	38 ⁰
Leftwards tilt	30 ⁰	36 ⁰
Right twist	65 ⁰	71 ⁰
Left twist	62 ⁰	70 ⁰

Table 2. Table of the values obtained in the coordination test

Matorin test	Initial testing	Final testing
Right twist	180 ⁰	215 ⁰
Left twist	150 ⁰	190 ⁰

Table 3. Table of the values obtained in the "candle" test

"Candle" test	Initial testing	Final testing
	1 m	1.75 m

Table 4. Table of the values obtained in measurement of chest girth

Chest girth	Initial testing	Final testing
Exhaling	58 cm	59 cm
Rest	60 cm	61 cm
Inhaling	64 cm	67 cm

Table 5. Table of the values obtained in posturograph

Posturograph Sagittal plane	Initial testing	Final testing
Head	5.8 cm	2.6 cm
Shoulders	3.7 cm	2.7 cm
Hips	5.0 cm	2.5 cm
Knees	2.4 cm	0.4 cm

Conclusions

After comparing the results we highlight the following: *the amplitude evaluation spine* achieved an increase with 4⁰ - flexion 5⁰ - extension; 7⁰ - rightwards tilt, 6⁰ - leftwards tilt, 6⁰ - right twist, 8⁰ left twist; *Matorin test* achieved an increase with 35⁰ to right twist and 40⁰ left twist; *"candle"* test is an increase of 0.75 cm and at the *chest girth* we can notice an increase of the values in the exhaling and rest for 1 cm and 3 cm in the inhaling.

Upon comparing the results, an improvement of kyphotic posture may be noted, as follows: at head level, a decrease in values from 5.8 cm initially to 2.6 cm finally; at shoulder level, the value decreased from 3.7 cm to 2.7 cm; at hip level, the value dropped from 5 cm initially to 2.5 cm finally, while at knee level, from 2.4 cm initially to 0.4 cm.

Consequently, it may be highlighted that the kinesiotherapy routine combined with dancesport practices have led to positive outcomes, in a relatively short timeframe, which confirms their efficiency. In addition, besides the muscle toning, the subject acquired the capacity of being aware of his own correct stance, thus managing to correct himself.

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Comparative Study on the Differences Between Zumba and Aerobics Routines

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Abstract

Aerobic gymnastics is an efficient physical activity, where long-term training plays a central role, and the components of fitness develop through elaborate training routines. Zumba may be defined as a form of dance, with slow and fast rhythms, in order to obtain a balance between cardio training and muscle toning. *The purpose* of this paper was to design and apply a series of aerobic gymnastics and zumba routines in order to differentiate the aspects specific to the two forms of activity. The subjects of this study were 30 women practicing aerobic gymnastics and 30 women practicing zumba. The tests applied concerned: strength and resistance of abdominal muscles, of spine mobility in anterior plane, balance and coordination. *Findings*. As a general conclusion, it may be highlighted that: the strength and resistance indices of abdominal muscles and of coxofemoral mobility are higher in the aerobic group; in the zumba group, an improvement of the indices within the balance and motor memory tests was observed.

Keywords: physical activity; fitness; aerobics; zumba.

Introduction

Sports experts have striven to find new and more modern approaches to maintaining physical and mental fitness.

New kinds of structured physical activities, such as Pilates, Spinning, Zumba, and others, are all able to engage large segments of population. These disciplines are extremely attractive, probably also because of the extensive marketing activity that determines them as increasingly fashionable. In fact, these types of physical activity have persisted over the years, and the number of the participants is increasing (Thompson, 2014). Furthermore, some of these new physical activities have been examined and seem to be able to provide a large variety of health-related benefits (Bullo et al., 2015; Ross & Thomas 2010).

The popular Zumba fitness is a new kind of dance workout, inspired by Latin American music and Latin American dances. This group fitness program exercise combines the basic of dance merengue, salsa, samba, cumbia, reggaeton and other Latin American dances, uses basic aerobic steps, but also enriches their composition of the other dance like hip-hop, belly dancing, Indian, African dance, etc (Hižnayova, 2013). It is fusion of basic principles of aerobic interval training and strengthening exercises, which promote consumption of calories, improve cardiovascular system and strength of the whole body.

Zumba meets the definition of aerobic activity by its prolonged, rhythmic nature and use of large muscle groups. When exercise is „aerobic”, this means it helps your heart, lungs, and circulatory system work better. Zumba incorporates elements of strength training into its routines. Strength training involves the use of resistance to increase a person’s ability to exert or resist force. It encompasses a range of training modalities such as free weights, bands, tubing, and even your own body weight. The goal of strength training is to condition, develop, preserve, and strengthen your muscles. (Perez & Greenwood-Robinson, 2009). The great benefits that come about through Zumba are based on both physiology (the body) and psychology (your mind).

Effect on Nervous System

Various researchers began to investigate neurological effects of dance which requires complex mental coordination synchronizing music and movement. Dance constitutes a pleasurable intervention where brain’s reward centres are stimulated by music and sensory motor circuits are activated by dance. (Sharma et. al., 2017).

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By neuroaesthetics studies neuroscience researchers can investigate the integration of the sensorimotor functions (Hanggi et al., 2010), elements of aesthetics (Cross et al. 2011; Calvo-Merino et al., 2008) and emotion (Sawada, 2003) that arise from dance. To summarize, Dance form like Zumba seems a promising intervention for neuroplasticity in nervous system.

Effect on Cardio-respiratory System

The cardiovascular benefits of dance have been observed through aerobic dance forms such as Zumba (Jitesh et al., 2016). Other study looked at the changes in aerobic fitness with Zumba performance (Delextrat et al., 2016). It suggests that the Zumba participants showed a greater increase in VO₂ max.

Effect on Musculoskeletal System

In young normal weight females, Zumba improves trunk strength endurance and balance (Donath et al., 2014). Exercise increases lean muscle mass which has numerous advantages e.g. improved energy metabolism, improved vascularity, improved posture, and improved support to the skeletal framework. Furthermore, exercise has also been shown to strengthen muscles and improve balance and coordination. (Sharma et al., 2017).

The Ljubojević et al. (2016) research was to determine the effects of Zumba fitness model of exercise on reduction of women body fat mass. The research of eight week Zumba fitness program on women showed statistically significant effects on body fat mass reduction. The obtained result showed that Zumba fitness exercise achieved statistically significant improvement in body weight loss, body mass index, fat percentage, fat mass, right leg fat percentage, left leg fat percentage, right arm fat percentage, left arm fat percentage and trunk fat percentage. Zumba fitness for its specific form of exercising can be applied for various purposes: to improve motor skills, improve functional capacity, regulation of body weight and body composition, but also for the different categories of trainees: beginners, athletes, convalescents, children and adults. Its actual effects on different populations and for different purposes are yet to be examined (Ljubojević et al., 2016).

Zumba fitness could be considered as a type of aerobic training because the consistent improvements generally were found in the aerobic and cardiovascular outcomes. Overall, small-but-positive effects on body composition, muscular strength, balance, and quality of life also were found (Vendramin et al., 2016).

Moreover, various modalities of Zumba were adopted, such as “Zumba Exilarate” or “Zumba Ripped,” that modulate workout intensities differently (Sternlicht, 2013).

Aerobic Gymnastics

Examples of aerobic exercise include cycling, aerobics dancing, hiking, jogging/long distance running, swimming and walking. These activities can best be accessed via the aerobic capacity, which is defined by the American College of Sports Medicine as the product of the capacity of the cardiorespiratory system to supply oxygen and the capacity of the skeletal muscles to utilize oxygen (ACMS, 2013).

Various studies have been published that prove the advantages of aerobic exercise in reversing and preventing cardiovascular disease. In 2002, Wisloff et al. were the first to show the benefit of aerobic training in the myocardium after an ischemic event (Wisloff, 2002).

While aerobic exercise appears to have some beneficial effects, its contribution is limited on frequency and quantity. Schnohr’s research quantified 1 to 2.4 h of exercise over 2 to 3 times per week as the optimal quantity and frequency standard of aerobic exercise to promote improved health (Schnohr, 2015).

Aerobic Gymnastics has two different forms which are understood in its two concepts; one as a sport for everyone and included within fitness, and the other as a competitive sport. As a leisure physical activity, the exercises is generally done in group session programmes and under the supervision of a qualified professional. It respects the postulates of aerobic training and adds the specific use of technical movements whose speed, range and general execution depend on the musical base used (Rocio et al., 2013).

Aerobic Gymnastics seeks to contribute to the optimal functioning of the human body, to redefining body image, individual and social identities, and to facilitating social interaction. It offers a large variety of moves and multiple possibilities for the structuring of motion sequences by combining various elements and positions. The variety of technical elements that are permanently combined in a multitude of dynamic structures, combinations, compositions, rhythms and various choreographies, usually develop in a conjunction with a musical background (Pop & Ciomag, 2014).

Aerobic Gymnastics is an efficient physical activity for both the physical and the mental level, where long-term training plays a central role, and the components of fitness are developed using well-elaborated fitness routines. Aerobic Gymnastics routines are dance-oriented and they target an increase in muscle tone (with or without machines).

In this respect, we highlight these trends, without claiming to be exhaustive. Besides the classical aerobics classes representing the core of basic training - the following practice forms enjoy great appreciation from practitioners, namely: Dance-Aerobics, Interval-Aerobic, Circuit-Aerobic-Program, Slide, Aqua-Aerobic, Step-Aerobic etc.

Aerobic Gymnastics - through its organized unfolding - aims to improve fitness and mental comfort, to lead to optimal health status. The beneficial effects of systematic Aerobic Gymnastics practice are accessible to anyone, from childhood to old age (Orănescu et al., 2007).

In order to conduct an effective session of Aerobic Gymnastics, one must observe the following methodological principles: satisfaction through motion, progressive increase in the intensity and complexity of exercises, overcompensation, differentiated treatment, aesthetic principle, analytical and global relaxation (Nanu, 2009).

The objectives of the Aerobic Gymnastics are as follows: to optimize the movement capacity of the locomotor system and to improve fitness; to improve the function of the large systems (cardiovascular and respiratory); to develop the conditional capacities in conditions of aerobic effort; to develop the coordinative capacities; to educate and/or to correct body posture while maintaining various positions or while executing various movements; to train posture muscles (Moraru, 2015).

Material and method

The *purpose* of this paper was to design and apply Aerobic Gymnastics and Zumba routines in order to differentiate the aspects specific to the two forms of activity. The research *hypothesis* is featured below: by pointing out the aspects of Aerobic Gymnastics and the Zumba method, we will be able to highlight the differences between the two forms of exercising.

We used the following tests in the experiment: test for the strength and resistance of abdominal muscles (30"); spine mobility assessment in anterior plane; balance test (Flamingo test); coordination test - step structure in eight tempos: initial position - standing, T1 - knee, straight leg and extending arms forward; T2 - jumping jack, taking arms to the sides; T3-4 - skip, left leg, hands to the back; T5 - jog, right arm forward; T6 - jog, left arm up; T7 - jumping jack, arms crossed to the chest; T8 - return to initial position.

Warm up contained basic dance steps (march, step touch, side to side etc.) with gradually accelerating tempo of music, without leaps and jumps (120-135 bpm). In the second part of the warm-up the muscle toning exercises were performed with soft intensity through dance variations, slightly squats were allowed (tempo 125-140 bpm). The main part of the Zumba training was performed with 8-10 original Zumba fitness songs. The dance choreographies and movements intensity was created in accordance with tempo changing of music (tempo between 140-160 bpm). Each dance last 3-7 minutes, with pause 15-30 sec between dances. All Latin American dance choreographies (Merengue, Salsa, Samba, Belly dance, Cha cha cha, Tango etc.) with their differences in character and dynamic of the movement (Lukić, 2006) provide dosing of exercise intensity.

The Aerobic Gymnastics session lasts for 50-60 minutes and it comprises three parts: the introduction, the fundamental part and the closing part. Exercises included in the introduction include versions of walking, steps specific to Aerobic Gymnastics, artistic steps, running versions, spatial-temporal orientation exercises harmoniously embedded within choreographic structures, with a different degree of complexity, depending on the particularities of the group. The musical tempo for this part is 128 - 158 beats/minute for Low-Impact and 140 - 160 beats/minute for High-Low-Impact, while the duration is 20-25 minutes.

The fundamental part comprises the following means: exercises targeting the body parts executed from low stances (on the knees, standing, lying down); exercises for muscle strength and resistance executed on the floor; exercises for joint mobility and muscle elasticity. Music for the fundamental part must be slow (112-128 beats/minute) for exercises to be executed in full power, without take-off. The duration of exercises used in the fundamental part is between 15 and 20 minutes.

In the last part of the Aerobic Gymnastics session, the muscles used in the previous phases must be stretched, in order to prevent a shortening of these muscle groups or potential injuries at this level. However, besides this prophylactic aspect, exercises used in this part (mostly the stretching ones) also lead to improved mobility. They prepare the closing of the session; they ensure that heart rate comes back to values at rest and they begin body restoring after effort. Positions are maintained for 30 seconds for each position; music becomes a relaxing, calming background. Music should convey a feeling of physical and mental relaxation. This phase of the Aerobic Gymnastics session should take at least 5-10 minutes.

Results

Table 1. Values obtained in the test for the strength and resistance of abdominal muscles

Statistical indicators	Aerobics group	Aerobics group	Zumba group	Zumba group
	Ti (no. of repetitions)	Tf (no. of repetitions)	Ti (no. of repetitions)	Tf (no. of repetitions)
X	18.2	24.8	16.2	18.3
S	±3.273	±2.940	±2.265	±2.135
CV	17.98%	11.85%	13.98%	11.66%

In the Test for the strength and resistance of abdominal muscles, the mean increased by 6.6 repetitions in the Aerobics group and by 2.1 repetitions in the Zumba group; standard deviation decreases from ±3.273 to ±2.940 in the Aerobics group and from ±2.265 to ±2.135, in the Zumba group. Moreover, homogeneity has improved by 6.13 points in the Aerobics group and by 2.32 points in the Zumba group.

Table 2. Values obtained in the test for spine mobility in the anterior plane

Statistical indicators	Aerobics group	Aerobics group	Zumba group	Zumba group
	Ti (cm)	Tf (cm)	Ti (cm)	Tf (cm)
X	17	21	10.9	12.7
S	±1.438	±1.114	±1.539	±1.362
CV	8.45%	5.30%	14.11%	10.72%

Concerning the test for spine mobility in the anterior plane, the mean increased by 4 centimetres in the Aerobics group and by 1.8 centimetres in the Zumba group; standard deviation decreases from ±1.438 to ±1.114 in the Aerobics group and from ±1.539 to ±1.362, in the Zumba group; in addition, homogeneity has improved by 3.15 points in the Aerobics group and by 3.39 points in the Zumba group.

Table 3. Values obtained in the Flamingo test

Statistical indicators	Aerobics group	Aerobics group	Zumba group	Zumba group
	Ti (seconds)	Tf (seconds)	Ti (seconds)	Tf (seconds)
X	11.9	14.3	19	21.6
S	±1.729	±1.704	±1.438	±1.220
CV	14.52%	11.91%	8.45%	5.64%

As shown by the Flamingo test, the mean increased by 2.4 seconds in the Aerobics group and by 4.6 seconds in the Zumba group; standard deviation decreases from ±1.729 to ±1.704 in the Aerobics group and from ±1.438 to ±1.220, in the Zumba group; furthermore, homogeneity has improved by 2.61 points in the Aerobics group and by 2.81 points in the Zumba group.

Table 4. Values obtained in the coordination test

Statistical indicators	Aerobics group	Aerobics group	Zumba group	Zumba group
	Ti (correct movements)	Tf (correct movements)	Ti (correct movements)	Tf (correct movements)
X	4	6.91	4.2	8.35
S	±1.017	±0.900	±0.996	±0.559
CV	25.42%	13.02%	23.71%	6.69%

Upon analyzing the coordination test, the mean increased by 2.91 in the Aerobics group and by 4.15 in the Zumba group. On one hand, standard deviation decreases from ±1.017 to ±0.900 in the Aerobics group and from ±0.996 to ±0.559, in the Zumba group. On the other hand, homogeneity has improved by 12.40 points in the Aerobics group and by 17.02 points in the Zumba group.

Conclusions

After processing and interpreting the data for this study, the following conclusions may be drawn:

- Both the Aerobic Gymnastics and the Zumba routines have a three-part structure, while heart rate during the activities preserves the same curve: in the first part, heart rate of 120 - 140 b/min / 140 - 160 b/min, in the second part,

110 - 130 b/min, while in the third part, 110 b/min – close to values at rest. Both activities improve the aerobic resistance capacity and the function of the cardiorespiratory system.

- In the Zumba classes, the pause between two songs lasts 15-30 seconds and they use mostly dance steps, while during the Aerobic Gymnastics sessions, songs are mixed and they execute only basic steps of this sports branch.
- In Zumba, during a song, they execute only 3 or 4 step structures and they improve mainly motor memory and balance, because they use turns, arm movements in sync with dance steps, etc. In the Aerobic Gymnastics sessions, structures comprise one, two or more basic steps and the structure is repeated 2, 4 or 8 times.
- Given that during the Aerobic Gymnastics sessions, the fundamental part uses exercises executed on the floor for the development of main muscle groups, an improvement in the strength and resistance of abdominal muscles and in mobility has been noted, unlike the Zumba classes, where this part is not featured.
- As for the tests applied, the following aspects may be stressed: higher progress of the indices of strength and resistance of abdominal muscles and coxofemoral mobility was recorded in the Aerobics group, while the Zumba group showed an improvement in balance and motor memory.
- As a general conclusion, it may be stated that – by pointing out the aspects specific to aerobics and Zumba routines - differences were found between the two forms of activity. Thus, the study hypothesis was confirmed.

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Research Regarding the Influence of Training Programs Jumping Over Obstacles of Sport Horses on Competitive Performance Improving

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Abstract

Getting horses athletic performances in conditions of health security is directly correlated with understanding the influence and interaction between the typology of applied training methods and the factors that depend on the organism, being morpho-functional, psychological, environmental and food factors. In current research we intend to approach in detail the pre-competitional period in terms of improving the sport horse training and dressage methodology in relation with the specific individuality of each studied specimen. Morphologically speaking, the horse qualities are genetically transmitted, such as overall conformation, muscle mass / body weight ratio, metabolic type of muscle fiber and conformation of the respiratory tract. Most of the physiological factors are influenced by training, being correlated with the production of energy in different metabolic pathways, as well as the cardiovascular and respiratory necessary adaptations for the transport of the precursors from the site of synthesis and utilization of ATP. Prior to commencement of initial evaluations, knowing the results from jumping competitions and coaches indications, the horses were divided in two experimental groups (Lc and Lexp), constituted depending on age, performance and random selection. The horses are from Dumbrava stallions warehouse, located in Dumbrava village, Timișești, Neamț county. Considering that the experimental protocol of the current research includes monitoring and development of physical qualities defined by speed, strenght and resistance, it was followed features improvement by improving the specific parameters, which are: physiological parameters: maximum, medium and at rest heart rate and the concentration of lactic acid after each round, at V2 and V4 and two minutes after finishing the exercise and technical parameters: speed (V2 at 2 mmol/l lactate concentration and V4 at 4 mmol/l lactate concentration), the number of the obstacles thrown down at jumping over obstacles discipline, as well as the jumping technique and the energetic level evaluated by an observer and a horseman.

Keywords: training programs, sport horses, jumping over obstacles;

Introduction

Jumping over obstacles, like other branches of equestrianism, is a point of interest in development and modernization if horsemanship. Because equestrian sports have requirements specifically targeted towards the enlargement of formative influences for high level development of physical qualities, it is necessary for the instruction in training programs to be modernized using new ways and solutions.

To obtain athletic performance, both in humans and animals (Murariu O., 2018), it is necessary to know in detail the kinetic movement correlated with biochemical and physiological phenom which allow the development and evaluation of physical effort.

By training is meant to prepare the horse for sport trials, with the aim of highlighting at one time, its capabilities without health harming (Murariu F., 2014). By training is wanted to obtain the reduce of the abdomen size, the fat layer, the improve of the internal organs functioning and the habituate of muscles with strong continuous strains.

Typology of training is applied individually due to variations in energy potential. The horse is required at great effort, with pregressive morpho-functional changes in the body, based on a rational, planned and systematic work programe. In the process of training and development of energy capacity based on schemes, is assured the maximum physiological functions.

The principle of the sport training involves the the repetitive demand of the muscular system, which determines the improvement of the superior nervous activity, the elaboration and establishment of the necessary conditional

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connections, the motor skills and qualities, the morpho-functional improvement of all organs and systems (*Murariu O. et al., 2013a,b*).

The main purpose of horse training for the competition test is to develop resistance and to familiarize the horses with a specific and necessary skill to browse the standard obstacle course in a single day. As a result of individual training, the horse will gradually develop the functional capacity of the body, and it will be able to achieve maximum effort from the point of view of the muscular difficulty. Evolutionally, thanks to the training, the horse will gain a graceful stance, being easy to be driven and subjected to the rider's will, the unique objective of the couple formed (horse – riding) being the improvement of the jump technique in order to achieve performance.

During the pre-competitive training period, the horse is involved in a progressive physical training, complemented by the development of the physical qualities for practicing the technique of jumping.

All of this is done actively through the various ways of sport training, instruments that can be used to perform the functions and objectives proposed in the performance equitation (*Borza et al., 2016; Costuleanu et al., 2017*).

In the early stages of preparing a young horse for the obstacle test (the first 2 or 3 months), it is used as a basic element in the training technique, strictly following certain aspects: the preparation of the animalis carried out on the chord, and it is forbidden to ride it. Chord exercises will give the horse a muscular fortification that is easy to support the weight of the rider. This type of exercise contributes to the achievement of the contours of adjacent benefits, such as the gradual building of the horse's confidence in the rider, the knowledge and acceptance of his will, the correct learning of step by step walking, trap, gallop, quiet, cadence and balance, learning the first notions of driving and jumping over obstacles.

The duration of the first training sessions is indicated to be between 15 and 60 minutes, and the same things are done progressively and respectively in order to equip the horse with the execution and voice of the coach (*Dulgeac, 2005*).

In preparing the horse for the obstacle test and the complet test it is considered the improvement of jumping, horse habits with the correct approach of different types of obstacles, the development of the impulse and the flexibility in the movements, the habit of jumping the obstacles of force and speed.

The trained horse differs from the untrained horse through a series of features such us: it is supple, with the sucked abdomen, with the well developed muscles, well raised under the skin; ligaments and tendonos are resistant; after the effort, the horse sweat a little; returning breathing and pulse to normal within 15 – 20 minutes after the effort; intensive metabolic activity and the exercise temperature is between 38,5 - 39°C (*Blidaru A. și Blidaru M., 2010*).

The purpose of the paper

Equine speed at a lactate concentration of 4 mmol/l increases with the level of the training and the heart rate depends on the intensity, duration and frequency of its training.

Given the fact that till now there have been no research in terms of correlation between effort, medium heart rate and maximum heart rate, it has been found that it is necessary conducting the research of which has been highlighted that the maximum heart rate is an useful parameter in determination of sport horse physical condition. The aim of these researches is to improve the physical, technical and tactical training in jumping discipline, by optimizing the means and methods used in training; the optimization represent a practice way to approach the structure of the training process, based on the unity of the training principles, the set of possible methods of training as well as the real particularities of the experimental group working with.

Material and methods

The current research is part of a wider range within the framework of an extensive training pattern. The sport equines were tested at To time, prior to the training process and after the training period by three standardised tests, in the present research being presented the resulted obtained by the sport horses studied at TS2.

The material and method of the actual research was also presented by *Murariu et al. (2015)* in the in which was presented the results obtain of sport horses of the first standard test (TS1) and also the three types of training used in these researches.

The investigation were conducted on a total of 10 equines, representatives of romanian horses, each of it having a specific background, both in terms of competitions and precompetitive training.

The horses were divided in two experimental groups related to them results form jumping competitions and coaches indications, depending on age, performance and randon selection resulting Control Group (*Lc*) and Experimental Group (*Lexp*) (*Murariu et al., 2013*).

The two groups of equines were subjected into a different training method from the point of view of the exercise intervals for 8 weeks, for a total of eight sessions of training (*Murariu et al., 2015*). After the completing this period of training program, equine will rperform the standard test (TS2).

The studied horses have been conditioned 6 month before the beginning of reserch, as follows: polling out 1 h/day, riding training exercises 50 min/5 day/ on week. The equitation include general education 3 x weekly (10 minutes of heating, 25 minutes of trot and slowly gallop, 10 minutes of slow down) and jumping practice 2 x week. The jumping exercises taken 30 minutes and those includes jumping over some fences with moderate speed, with walking exercise between.

STANDARD TEST 2 JUMPING

STANDARD TRACK

- 16 jumping/round
- Track length: 72 m
- Natural condition: closed manege
- Speed: 225 m/min
- Sand surface
- 3 x 95 sec effort; 95 sec = one interval of effort
- 5 rounds
- Obstacles hight:
- I Interval = 40 cm
- II Interval = 65 cm
- III Interval = 85 cm

MONITORING:

- the number of obstacles shot down
- HRmax, HRavg (Polar 8000)
- Lactate concentration: after each 95 sec of effort; [Lactate]1,2,3; 2 minutes after effort;
- The evaluation of the technical jumping and of the energetic level

During training interval and testing period each 5 days for 8 weeks. Between the intervals sessions, horses will exercises 30 minutes on day of submaximal level (HR < 150 bpm). In addition, the horses conducted exercises in stalliation 45 minutes/ day and day were driven out 1 hour on day.

Applying the standard test on jumping it were evaluated the number of obstacles shot down, the maximum heart rate, the average heart rate, the lactate concentration after each interval and 2 minutes after effort and the technical jumping and it energetic level (Fig. 1).

The standard set on TS2:

- Heating 10 minutes followed by 10 minutes of trot and gallop exercises;
- In TS2 it were used 6 small obstacles;
- Heart rate was determined with a Polar RS8000. The data from the Polar watch was analysed on computer. The horses was equipped with a Polar watch on saddle. The device is removed at 15 minutes after the test finished (Murariu *et al.*, 2014).

The determination of lactic method acid

The blood was taken from the jugular vein with a needle of 23 g for the lactate concentrate determination. The principle of the method consist in the transformation of the lactic acid into pyruvic acid

Fig. 1. The standard test (TS2) applicated on equines before and after training

by the action of the lactoperoxidase, process witch arises an equivalent amount of oxygenate water witch forms with 4-aminoantipyrine a colored quinine compound. Between blood sampling for lactate measuring test at the end of exercises and after two minutes of effort, the horses were ridden.

Result and discussions

The efficiency of the training consists in inducing the desired physical condition by self – improvement of the physical resistance limit of each individ (Murariu *O. et al*, 2014). Exceeding this limit refers to achieving physical performance of sufficient intensity and duration over time to produce a certain overuse of the body. For the efficiency of the training, there must be a repletion of training stimulus. The number of these repetitions depends on the time and intensity of the exercise. If the training steps are succed without allowing a time to return before repeating the exercises, then the total effort required to obtain a training response time may be lower than the time required to return between the different stages of the training.

The stimulus produced by training must be of sufficient duration to induce an effect. The art of training involves the judicious use of exercises of varying intensity and duration over time, so as to induce the optimal adaptation of the body to the effort, which will allow successful competition in sport performance, without causing overload or physical trauma to the horses.

By applying the second standardized test, it has been showed that Lexp obtained significant better result than Lc, which have shown no improvement.

By applying TS2, the medium values of maximum heart rate and medium heart rate were higher in the initial moment (T_0) than the measured values after 8 weeks of training (T_i), being noticed the positively impact of the trainings on both groups. It can be seen that the medium values of heart rates increase proportionally with those of

plasma lactate during the three measurement intervals. It can be concluded that L_{exp} showed clear improvement of physical condition as response to the 8 special training sessions practiced.

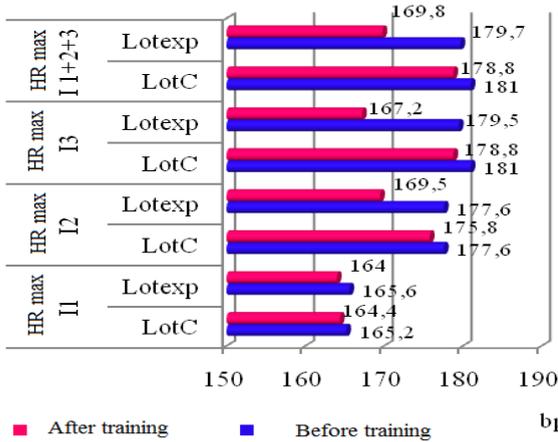


Fig. 2. Heart rate variation before and after training

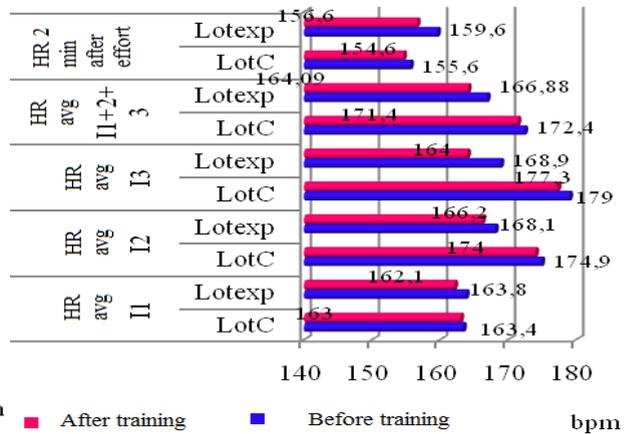


Fig. 3. Heart rate variation for the two groups depending on the training type

Overall, higher values for the maximum and average HR in Lc equine are shown both at T₀ moment and after training period (T_f) (Fig. 2, Fig. 3). Concerning the comparisons between the two equine groups studied (Lc and Lexp) from the perspective of the maximum heart rate, it was found that they showed uniformity values at T₀ moment in the first two intervals analyzed and varied very low in the 3rd average value in interval 3.

This uniformity of values of the two equine groups was maintained in the first interval and after the 8 weeks of training, but in the second and third intervals there were found values that present oscillatory domains with constant superiority for Lc and lower values of HR_{max} to Lexp (Fig. 4). It can be concluded that Lexp has shown a marked improvement in physical condition in response to the effort made in the 8 special training sessions.

If a HR of 179,5 bpm is suggestive for effort intensity as described by Evans and Rose (1998) then the level of effort in TS2 was very similar despite the difference speed, number of jumps and the height of the jumps.

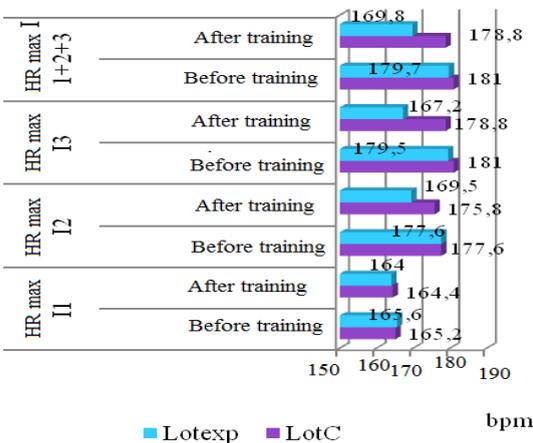


Fig. 4. Maximal heart rate variation for the studied groups

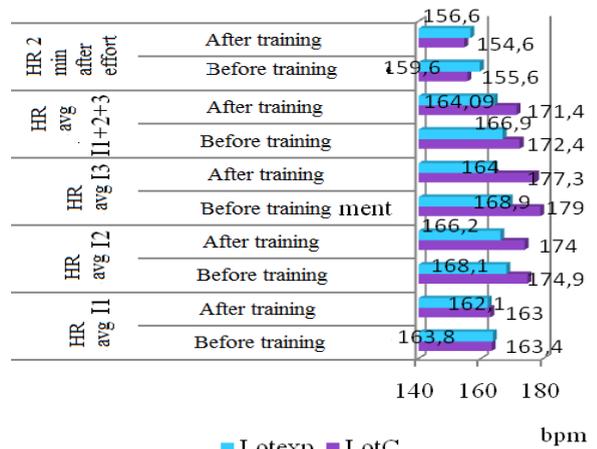


Fig. 5. Medium heart rate variation for the studied groups

In figure 5 it can be observed that at the T₀ moment the two groups of horses are at the same level of physical conditions by HR_{avg} (163,4 bpm for Lc vs. 163,8 bpm for Lexp). In the following intervals (2 and 3) the HR_{avg} measured in T₀ moment highlighted values that ranged from different oscillatory domains, revealing the existence of statistical differences of the physical conditions between the equines of the two studied groups. After training session, there were significant differences between the two equine groups (Fig. 5), showing significant improvement in the physical condition in response to Lexp equine training, which showed lower values of medium HR.

It was also highlighted that in the initial moment (T₀) the two groups had very close values, statistical differences being insignificant (p<0,05) in all intervals in which the measurements were taken, and in final moment (T_f) the values uniformity is not kept, blood lactate concentration with higher values being presented for Lc equines in all

measurement intervals, statistical differences between the two groups after training period being very significant ($p > 0,001$) both for the 3 intervals and after 2 minutes from effort (Fig. 6, 7).

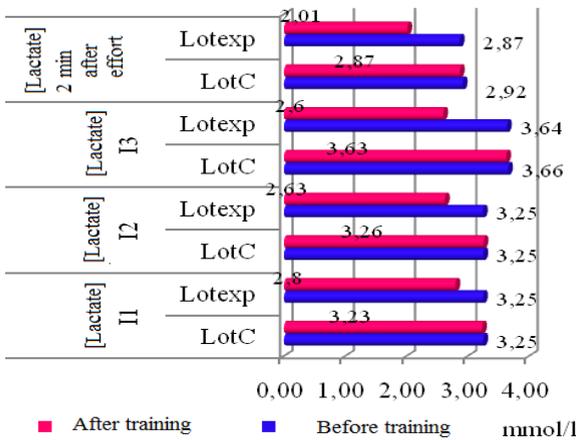


Fig. 6. Lactate concentration evolution during obstacle trail

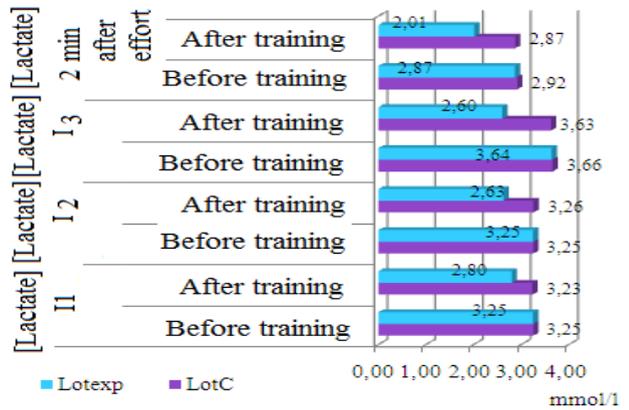


Fig. 7. Lactate concentration variation for two groups of horses depending on the training type

Looking from the differences occurring for equine physical condition perspective (expressed in blood lactate concentration during and after effort) between the two periods of taken measurements (before and after training) it's been showed that Lc equines have insignificant improved its physical condition, the medium values ranging in related fields.

Munk (2009) has shown in his studies that equines have higher lactate concentration during timed races than during unanticipated events with the same degree of difficulty.

Instead, for Lexp equines it's showed that the training had a significant effect on physical condition in terms of performing jumping over obstacles in the 2 standard tests, the medium values of lactate concentration from the 3 followed intervals and 2 minutes after effort being lower after training than before training period. The level of lactate shows the Lexp equine aerobic capacity improvement, during training periods.

In TS2, blood lactate concentration two minutes after effort shows a distinctly significant improvement for Lexp equines, that being very important for planning training sessions.

The average number of thrown down obstacles increased with every jumping interval, this result being unsurprisingly, because the height of the obstacles was increased at the same time in which the horses became tired. The number of thrown down obstacles in every jumping interval and the total number of thrown down obstacles decreases after 8 weeks period of training (Fig. 8). Lexp equine stand out through a significant decrease of thrown down obstacles number after training period, in comparison with Lc equine which have a decrease of obstacles number, but not that pronounced.

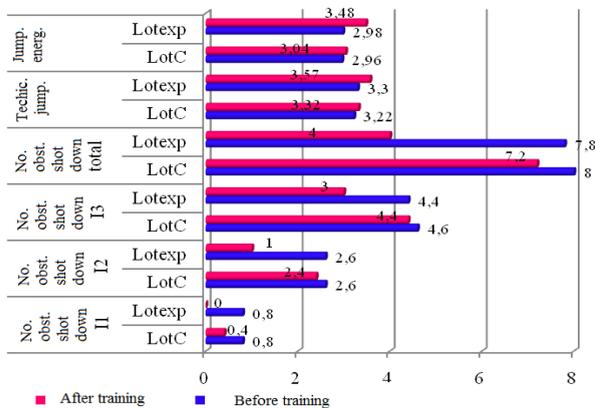


Fig. 8. The evolution of jumping descriptive parameters after training sessions

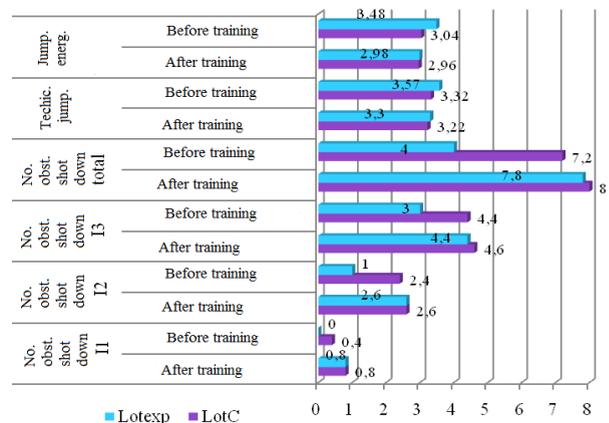


Fig. 9. The variation of jumping specific parameters from the two equine groups depending on the practiced type of training

In terms of jumping technique, there were not revealed significant effects of training for both groups, instead, the energy level during the jump was significantly improved ($p < 0,01$) for L_{exp} after training.

There are no differences between the two equine groups for thrown down obstacles in the three jumping intervals in T_0 moment (before training), instead, after applying the differentiated training sessions on the two groups is remarkable the fact that are significant differences ($p < 0,01$) in 2 and 3 intervals between L_{exp} and L_c , and distinctly significant differences for the total number of the thrown down obstacles (Fig. 8,9). It can be concluded that the L_{exp} physical condition was improved after 8 weeks of training.

After evaluating the technique and jumping energy by equestrian, it shows that in T_0 moment the differences between the two groups are insignificant, instead, after the training sessions, L_{exp} equines were appreciated by higher score, highlighting significant differences between the two groups.

The training method proposed by current research showed a distinctly significant improving effect ($p < 0,001$) on heart rate evaluated in three jumping intervals, very significant ($p > 0,001$) for lactate concentration and significant for thrown down obstacles number, jumping technique and energy.

The thrown down obstacles total number on the three intervals at the application of TS2 in Tf moment showed values that are involving the existence of distinctly significant differences ($p < 0,01$) between the two groups as a response to the type of training.

Conclusions

By the current researches it is found out that the equine muscles have a bigger inherent potential of adapting to the exercise pressure, this fact being important for a correct training and an improvement of motive force. The riders were satisfied by the training and testing method and the horses seem to enjoy it.

In the process of physical condition assessment based on TS2, it was observed that the three training intervals (the gallop, the sprint and exercises related to jumping rhythm) presented a positive impact on equines from L_{exp} , leading to a significant reduction of heart rate, the lactate concentration and the number of knockdown barriers during the second test.

By performing the training for jumping rhythm and applying TS2 in indoor riding, it is observed that there are necessary many persons for a rapid adjustment of obstacles between shifts and the horses tolerated in a very different way this test (some of them were wrong during the race, while others were very attentive).

The riders were satisfied by this test and training method, mentioning that people must be experienced practitioners in jumps for allowing the increase of necessary height during managing equine at maximum effort.

The current researches argue the positive effect of the three training methods proposed to the energy metabolism measured by lactate. The improvement of the aerobic metabolism has effect on the energy level from events with jumps and has influences on the technical ability evaluated by the rider.

It is found out that the training methods which were performed by L_{exp} presented a positive effect on the number of knockdown barriers during TS2.

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Evaluation of the Presence of the Pesticide Residues and it's Metabolites from Raw Materials Used as Sources for Ensuring a Healthy Nutrition for Athletes

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Abstract

Ensuring a proper quality of food is a necessity of a massive impact ensuring on athletes' performance. Appropriate nutrition is important for all human categories, but athletes are especially dependent on this factor because an incorrect diet affecting performance. The nutritional needs of athletes vary according to their age, gender, body constitution and type of sporting activity. An irrational diet can affect the performance of the best athletes, while the right balance of energy, macronutrient and micronutrient is a determining factor in achieving maximum performance. The calorie requirement of an athlete increases proportional to the activity intensity, ranging from 2,000 to 5,000 calories per day. Considering that in order to achieve optimal performance, athletes must follow a balanced diet of carbohydrates, proteins and lipids, and the carbohydrates and proteins must come from healthy sources (such as oats, rice, wheat, buckwheat, soya, fruit and vegetables), the purpose of this study is to evaluate the presence of pesticide residues and its metabolites from raw materials.

For the separation, identification and quantification of pesticide and it's metabolites present in plant sources, it was used the gas chromatographic method on the ECD and MD detector. One of the strategies for increasing crop productivity is effective pest management because more than 45 % of annual food production is lost because of the disease and pest infestation. However, the sporadic use has been leading to significant consequences not only to public health but also to food quality resulting in an impact load on the environment and hence the development of pest resistance. Also athletes may be exposed to pesticides and it's metabolites (found in environmental media such as soil, water, air, and food) by different routes of exposure such as inhalation, ingestion, and dermal contact, exposure that may result in acute and chronic health problems.

Keywords: healthy foods, raw materials, pesticide residues, athletes performance

Introduction

Physical activity, athletic performance and recovery after effort are enhanced by optimal nutrition.

Food selection should be done in a suitable manner such that energy and macronutrients needs, (especially carbohydrate and protein) must be met during times of high effort of physical activity to maintain body weight, replenish glycogen stores and provide adequate protein to build and repair tissue (Murariu O. et al., 2013; 2014).

Ensuring a proper quality of the athletes nutrition, as a necessity of survival, progress and achieving the performance represents a major problem for sportive evolution (Gavril R. N. et al., 2012, 2013; Murariu F. et al., 2013, 2014), the main objectives being adopting some solutions which will decrease the pollution of vegetable raw materials and increase the overall quality of the environment.

The nutritional needs of athletes vary according to their age, gender, body constitution and type of sporting activity. An irrational diet can affect the performance of the best athletes, while the right balance of energy, macronutrient and micronutrient is a determining factor in achieving maximum performance. The calorie requirement of an athletes increases proportional to the activity intensity, ranging from 2,000 to 5,000 calories per day.

Chemical pesticides have contributed greatly to the increase of yields in agriculture and horticulture by controlling

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pests and diseases and also towards checking the insect-borne diseases (malaria, dengue, encephalitis, filariasis, etc.) in the human health sector (*Arsenoaia V., 2018*). The need to increase world food production for the rapidly growing population is well recognized (*Bempah et al. 2011; Bettencourt da Silva et al., 2010; Bidari et al. 2011, Leonte E et al., 2016*). One of the strategies to increase crop productivity is effective pest management because more than 45 % of annual food production is lost to pest infestation (*Velescu I. et al., 2014*). However, the sporadic use has been leading to significant consequences not only to public health but also to food quality resulting in an impact load on the environment and hence the development of pest resistance (*Bidari et al. 2011; George and Shukla. 2011*). Also humans are exposed to pesticides (found in environmental media such as soil, water, air, and food) by different routes of exposure such as inhalation, ingestion, and dermal contact. Exposure to pesticides results in acute and chronic health problems (*Hadi N., 2014*).

The fast rhythm of the modern lifestyle led to changes in the way of cooking and consuming the different types of food (*Tulbure A. et al., 2014*). A positive result of these changes was the fast accessions of the food technologies, preparing and packing it, in order to offer a safe and qualitative supply of edibles. Despite the existence of this new discoveries, it can appear the risk of contamination of food through natural contaminants or accidentally introduced, but also through inadequate treatments of raw materials and alimentary products (*Irimia L et al., 2017*).

According to European Union and Global Health Organization – food safety is everyone's responsibility, starting from its origin until the moment it gets on the table. For maintaining the food quality and safety during the mentioned chain, there are necessary procedures to assure the integrity of the food and monitoring procedures, to ensure finishing the operations in good conditions.

The quality of the unprocessed raw material is crucial in the safety and quality of the processed products. Therefore, it's necessary a systematic approach on the whole chain of food, to avoid their contamination and to identify possible risks.

If a contaminant agent generates a risk or not, depends on a lot of factors, including the substance absorption and toxicity, the quantity in which the contaminant appears in the food, the quantity of contaminated food and the duration of exposure. Despite these aspects, the individuals are different regarding their sensibility, and also the other dietary factors can impact the toxic consequences of contaminants. Another factor which complicates the things regarding chemical contaminants is that most of the studies regarding the toxicity of contaminants represent the studies made on animals. It is not known exactly if the chemicals present the same effects on the humans, respectively of different categories of athletes.

The purpose of the paper

Taking into account that the main route of athletes exposure to pesticide residues is food consume, this model is considered to be five orders of magnitude larger than other exposure routes such as drinking water or inhaled air (*Hlihor et al., 2017*). High levels of the pesticide residues may have undesirable effects on the athletes health. Determining the level of pesticide residues in raw materials at the time of harvesting, marketing, industrialization or just before consumption in fresh state is very important not only for the correct assessment of the risk to the health of performance athletes but also for optimizing effective management at the level of farmers, specialists and traders.

The main objective of the research is based on the improving the technology of safe food products obtain through increasing the quality and quantity of raw materials, and of economical efficiency and also to ensure safe foods for all athletes categories.

Material and methods

For the estimation of pesticide residues belonging to different types of compounds, from raw materials it were used different methods of extraction and quantification.

It were analysed 42 samples, at the request of the beneficiary for different raw materials and products of vegetable origin. 41 of the analysed samples were autochthonous products from different areas of Romania (Iasi, Suceava, Bacau, Piatra Neamt, Cluj – Napoca, Salaj, Vaslui and Tulcea) and an import sample from Denmark. The analysed samples consisted of wheat, corn, bakery, bakery wheat, barley, potatoes, yellow beans, green beans, wheat seeds and wheat flour. Samples were received at room temperature (20 - 21°C).

By residues is meant any substance that has a pharmacological function and other substances including its derivatives and metabolites which are not naturally found in raw materials and products of plant origin, but which can be recovered as a result of consciously or accidentally incorporating these products and which, by exceeding permitted limits, may constitute a risk factor for human health, including the health of performance athletes.

By pesticide residue is meant pesticides, their metabolites and their reaction products which are present in or on food products.

For the determination of pesticide residues, the chromatographic gas technique was used. The samples that were

in the form of cereals were subjected to a grinding operation with the G19 200.

The pesticide residues were extracted with organic solvents (acetone/ methylene chloride 50/50), followed by homogenization, centrifugation and concentration.

The extract was dissolved in a specific organic solvent and then injected into gas chromatograph using MS and ECD detectors.

The ECD detectors was used for the following categories of pesticides: *hexachlorocyclohexane (HCH) isomers, dichlorodiphenyl trichloroethane isomers and its metabolites (DDT), aldrin, endosulfan, alpha cypermethrin, bifenthrin, boscalid, captan, chlorothalonil, cyfluthrin, mixt, deltamethrin, dieldrin, endrin, fenvalerate, folpet, heptachlor, iprodione, cyhalothrin lamda, methoxychlor and mixed permethrin.*

The presence of the following pesticide categories has been evaluated through the MS detector procedure: *dichlorvos, phosdrin, acephate, omethoate, diphenylamine, phorate, dimethoate, carbofuran, atrazine, diazinon, disulfoton, pirimicarb, chlorpyrifos – methyl, metribuzin, vinclozolin, parathion – methyl, carbaryl, pirimiphos – methyl, fenitrothion, dichlofluanid, malathion, chlorpyrifos, fenthion, parathion and phenthoat.*

Standard solution and internal standards (Triphenylphosphate – TPP and Mirex) were prepared by weighing 100 mg of active substance with toluene to the mark in a 100 cm³ flask.

It were prepared individual calibration solution and internal standard containing 10 µg/ ml in isooctane – toluene and the pesticide compound standard solution containing 10 µg/ ml, 20 µg/ ml and 50 µg/ ml in isooctane – toluene and standard compound solution of 1 µg/ ml of pesticide in isooctane – toluene.

The calibration curve was determined using intermediate solutions, respectively standard compound solutions of 0,01 µg/ ml; 0,02 µg/ ml; 0,04 µg/ ml; 0,06 µg/ ml; 0,08 µg/ ml and 0,1 µg/ ml. Also, it was run a blank sample for the purity test of the reagents.

Working conditions for the GC/ ECD separation: injection temperature: 250°C; detector temperature: 300°C, carrier gas: helium purity 99,99% at a flow rate of 2 ml/ min and make-up; nitrogen purity 99,99% with a flow rate of 25 ml/ min and injection volume: 1 µl.

Working condition for GC/ MS: injection temperature: 250°C; detector temperature: 250°C, carries gas: helium, injection volume: 1 µl. The pesticide content was expressed in ppm (mg/kg).

Result and discussion

Increasing the public interest regarding the possible health risk of pesticide residues in diet has profoundly changed the strategies for agricultural crops, with emphasis on quality and food safety. In addition, the growing concern for health society has led to strict regulation of pesticide residues in food (*Korytar, 2002*).

Today is acting towards in a conscious approach to the moderate exposure for long – term to pesticide and to the adoption of methodologies to analyze pesticide residues.

The exposure assessment of athletes to the risk of health and automatically of the lower sports performance was performed based on the content evaluation of the pesticide residues levels from vegetable raw materials and some derived products, analyses that carried out throughout 2014.

Food consumption data is an essential component of the risk assessment for the health of performance athletes.

Referring to food consumption rate for cereals and its derivate products (wheat, rye, green beans, yellow beans, wheat flour, etc.) in the E.U., the estimate was obtain by multiplying the residual concentration of pesticide (mg/kg) in the vegetable raw materials samples with the consumption rate (kg/ day) and the distribution of the product to the body weight (*Elmadfa, 2009*).

These calculation were based on the hypothetical orientation to the 80 kg bodyweight of performance athletes and 35 kg of teens athletes with a maximum absorbtion rate of 100% and a 100% bioavailability rate (*Bempah. 2011*). The hazard indices (HI) for the performance athletes were estimated to be the ratio between the estimation of pesticide exposure doses and the reference doses, which are considered to be safe levels of all lifetime exposure (*Bempah, 2011*). For the HI > 1, the vegetable raw materials and its derived products subjected to analysis are considered a risk to consumers, also for the performance of the athletes, while HI < 1 is considered as an acceptable limit with no risk to human health (*Hlihor et. al., 2016*).

Table 1 - Pesticide residues from the groups of organochlorines, organophosphorus, carbamates and pyrethroids from vegetables raw materials and it's derived in 2014

Sample name	Provenance	ORGANOCHL. (mg/kg)	ORGANOPHOSP. (mg/kg)	CARB. AND PYRETHROID (mg/kg)
Corn	BT	<LOQ	<LOQ	<LOQ
White flour (650type)	NT	<LOQ	<LOQ	<LOQ
Bakery wheat	MŞ	<LOQ	<LOQ	Bifenthrin = 0,033
Wheat flour	BT	<LOQ	<LOQ	<LOQ
Wheat flour	VS	<LOQ	<LOQ	<LOQ
Bakery wheat	SJ	<LOQ	<LOQ	<LOQ
Wheat consumption	CJ	<LOQ	chlorpyriphos – methyl = 0,013; malathion = 0,018	<LOQ
Wheat consumption	MS	<LOQ	<LOQ	<LOQ
Wheat bran	CJ	<LOQ	<LOQ	<LOQ
Bakery wheat	MS	<LOQ	<LOQ	<LOQ
Wheat flour	SM	<LOQ	<LOQ	<LOQ
Wheat flour	BC	<LOQ	<LOQ	<LOQ
Corn	BC	<LOQ	<LOQ	<LOQ
Wheat consumption	BC	<LOQ	0,029	<LOQ
Wheat flour	DN	Lindan = 0,034; Boscalid = 0,263; Endosulfan = 0,038	<LOQ	chlorothalonil = 0,017; Cypermethrin = 0,593; Deltamethrin = 0,037
Corn	CJ	<LOQ	<LOQ	<LOQ
Wheat consumption	VS	<LOQ	<LOQ	<LOQ
Wheat seed Alex variety	VS	<LOQ	<LOQ	<LOQ
Wheat seed Serina variety	VS	<LOQ	<LOQ	<LOQ
Wheat	IS	Folpet = 0,048 folpet = 0,035	<LOQ	<LOQ
Barley	SV	Iprodione = 0,033	<LOQ	<LOQ
Green bean	TL	<LOQ	<LOQ	<LOQ
Corn	TL	<LOQ	<LOQ	<LOQ
Yellow bean	TL	<LOQ	<LOQ	<LOQ
Wheat flour	SV	Folpet = 0,056	<LOQ	<LOQ
Wheat flour	VS	Folpet = 0,052	<LOQ	<LOQ
Potatoes	TL	<LOQ	<LOQ	<LOQ
Potatoes	TL	<LOQ	<LOQ	<LOQ
Bakery wheat	NT	Folpet = 0,056	<LOQ	<LOQ
Wheat flour	NT	<LOQ	<LOQ	<LOQ
Green bean (fresh)	TL	<LOQ	<LOQ	<LOQ
Green bean (freezed)	TL	<LOQ	<LOQ	<LOQ
Yellow bean (freezed)	TL	<LOQ	<LOQ	<LOQ
Wheat seed	IS	Folpet = 0,033	<LOQ	<LOQ
Rye seed	IS	<LOQ	<LOQ	Deltamethrin = 0,174
Corn seed	IS	<LOQ	<LOQ	<LOQ
White flour (650 type)	SV	<LOQ	<LOQ	<LOQ
Corn	VS	<LOQ	<LOQ	<LOQ
Corn	BT	<LOQ	<LOQ	<LOQ
Potatoes	IS	<LOQ	<LOQ	<LOQ
White flour	BN	<LOQ	<LOQ	<LOQ
Potatoes rings	NT	<LOQ	<LOQ	<LOQ

LOQ – limit of determination - A LOD practically is the lowest level at which an analyte can be safely detected in the matrix;

The sources of vegetable raw materials and some derived products, which were analysed in 2014, revealed a high number of products with no pesticide residues, accounting for 83,33% and the difference of 16,67% was represented

by the following species in descending order: wheat which showed 6 samples with residues from the total of 24 wheat samples analysed, occupying a weight of 25%, followed by barley with a sample where the presence of an active substance was identified.

Noteworthy would be that corn, wheat bran, green bean, yellow beans, potatoes and rye did not present pesticide/metabolites residues, being safe for human consumption. It is also highlighted that all identified residues showed values (mg/kg) below the MRL limit.

It should also be underlined that the only analysed sample of provenance from Denmark presented 6 residues of pesticides (lindane, boscalid, endosulfan, chlorothalonil, cypermethrin and deltamethrin; the boscalid showing superiority of 0,263 mg/kg being surpassed by cypermethrin that reached a rate of 0,593 mg/kg.

Analyzing the highest frequency of the identifications number of the active substances in the analysed samples, folpet is first on position, followed by deltamethrin.

The active substance – folpet was identified as being present in different proportions in 4 of the wheat samples analysed and two samples of wheat flour.

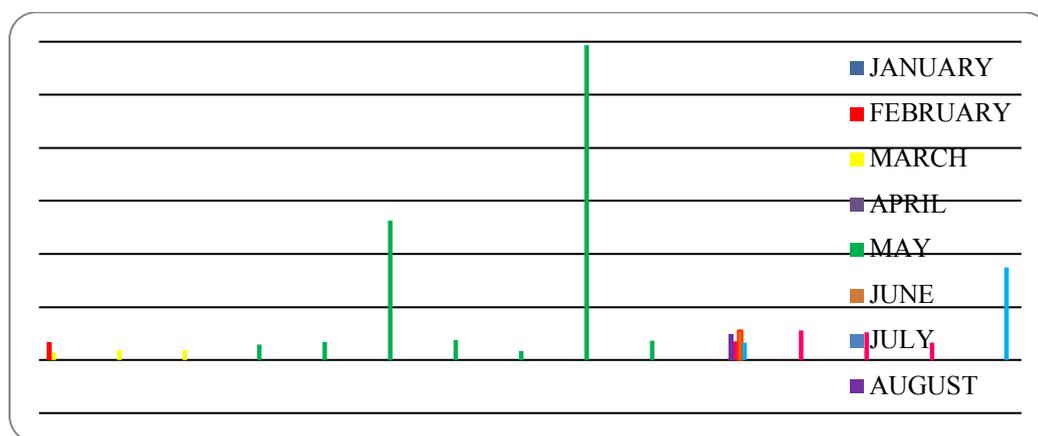


Figure 1 – Residues of pesticides identified during months of 2014

Based on the analysis period, it can be concluded that the highest frequency of pesticide residues was found in may, with 7 identifiers followed by February with 4 identifications.

The months of 2014 in which the analysed samples did not reveal the presence of any pesticide residue are January, april and December.

Table 2. The properties of pesticides identified in vegetable raw materials

Active substance	Formula	Molecular mass [g/mol]	Solubility in water [mg/l]
Bifenthrin	C ₂₃ H ₂₂ ClF ₃ O ₂	422.9	<1 µg/L
Chlorpyrifos-methyl	C ₇ H ₇ C ₁₃ NO ₃ PS	322.5	3
Malathion	C ₁₀ H ₁₉ O ₆ PS ₂	330,35	145
Chlortholonil	C ₈ C ₁₄ N ₂	265.9	0.81
α-cypermethrin	C ₂₂ H ₁₉ C ₁₂ NO ₃	416.3	4.54
Lindan	C ₆ H ₆ Cl ₆	290,83	7,5
Boscalid	C ₁₈ H ₁₂ Cl ₂ N ₂ O	343,2	4,6
Endosulfan	C ₉ H ₆ Cl ₆ O ₃ S	406,9	0,33
Folpet	C ₉ H ₄ Cl ₃ NO ₂ S	296.6	0.8
Deltamethrin	C ₂₂ H ₁₉ Br ₂ NO ₃	505.2	0.0002

By the gas chromatographic analysis carried out in the researches presented for the identification of pesticide residues from the vegetable raw materials and its derived products that make up the basic food ration of the performance athletes, the presence of 10 compounds whose physicochemical properties have been described in Table 2.

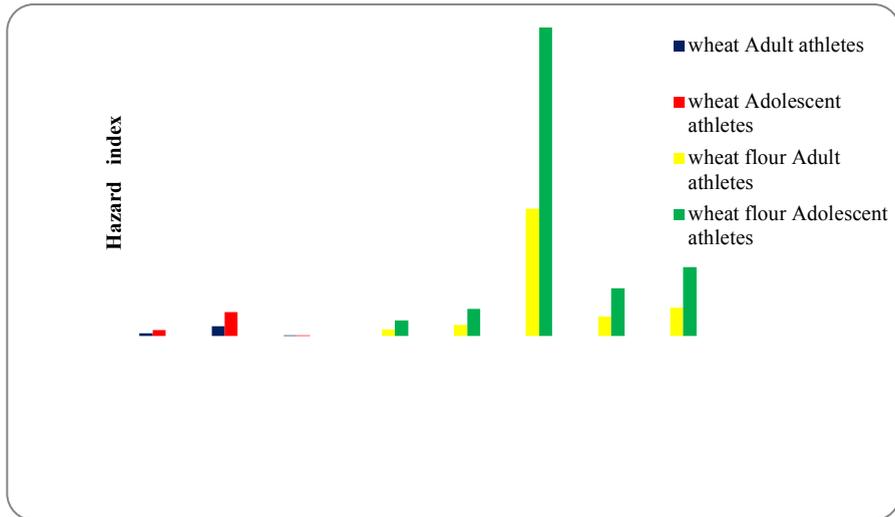


Figure 2. Hazard Index calculated for pesticide residues found in wheat and wheat flour in 2014

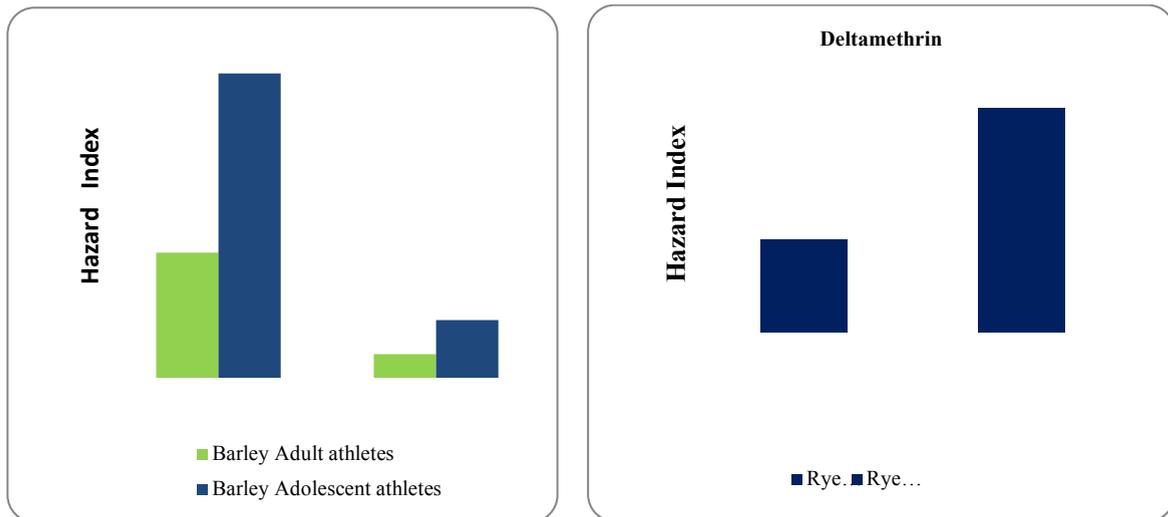


Figure 3. Hazard Index calculated for pesticide residues found in barley and rye in 2014

The results of health risk analysis for performance athletes based on consumption data in EU – 27 revealed that lindane can represent a health risk for teens athletes after the consumption of food products derived from imported wheat flour.

The HI values obtain for all others active substances revealed that the consumption of the analysed vegetable raw materials doesn't represent a risk for teens or adults athletes.

Daily intake of food products with a minimum content of some pesticide residues is allowed, without having immediate negative effects or even during the whole life of athletes.

Normally this permission is controlled by MRL (*Maximum Residues Level*) expressed in mg/kg/day or ppm. The acceptable pesticide residues limits for each class of pesticide and its metabolites are greatly diminished below the actual intoxication risk, which is a fairly high safety factor. The permissible daily allowance is the same for all categories of the population, regardless of age or body and physical constitution.

From current research it can be concluded that health risk for teens athletes is found to be associated only with lindane which was found in an imported wheat flour product.

Finally, it can be concluded that performance athletes can consume in safe conditions cereal products, yellow and green beans as well as potatoes because pesticide residues are found in very low proportions or even for most metabolites are undetectable.

It should be noted that although most concentrations of different pesticide were far below the established tolerances, particular attention should be paid to the fact that a continuous consumption of products with a moderate

level of contamination generates progressive accumulations in the recipient's body, threats to the long term human population.

It is of major importance that the farmer respects the recommended waiting periods and good agricultural practices (GAP) (Mayank Bhanti *et al.*, 2007). It is also recommended to be made the farmers training in order to know the degree of safe use of pesticide.

By using pesticides in adequate quantities and by restricting the application of treatments prior of harvesting or during storage, will ensure that the level of residues is reduced to a minimum and thus a safe diet for all classes of population, including athletes, thus ensuring optimum conditions for achieving performance.

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ICU 2018

Development of Technical Skills in Representative School Team of Female Soccer Players

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Abstract

Purpose. The aim of this study is to develop technical skills in female soccer players from the representative school team by using relay races and motion games. **Methods.** To evaluate the effects of relay races and motion games twenty female soccer players, divided into a control or an experimental group, were tested for juggling, dribbling through cones, pass precision and shoot precision. **Results.** The use of relay races and motion games in the training of female soccer players resulted in significant improvements of the technical skills in experimental group ($p < 0.05$).

Keywords: technical skills; female soccer players; representative school team;

Introduction

As in most sport branches, in soccer, both general and specific motor skills are needed, which must be developed at higher parameters, so that the soccer female player can achieve superior performance and stay on top. However, the presence and training of physical qualities are not enough to achieve outstanding performance (Muşat G.C., Petcu, D., Popa, C, Ochiuleţ, D., 2014).

These can only be achieved by adequate training of both physical, physiological and psychological parameters, as well as technical and tactical ones. The importance of the technique is also reflected in the influence it exerts on the other factors of the training, especially the tactical, because in order to apply a superior tactics, superior technical execution is required first (Gidu D.V. et al. 2017). The technique of the big soccer players is characterized by a series of elements such as: developed ball sense; visual perception and sense of balance; the finesse of executions; precision and variety of technical processes. Specific technical abilities are basic components in the evolution of soccer players (Malina, R.M. et al 2005) and they must be permanently trained. So good training technique involves continuous modeling exercises used, starting with the free exercise performed with low intensity, continues with the appearance of semi-active and active opponent and ended with executions carried out during time crisis and space crisis and adversity (Stănculescu G. et al 2012).

Therefore, our effort to highlight ways to strengthen and refine the technical procedures of attack in the female soccer practitioners is particularly useful, with implications both in theoretical and practical terms.

Methods

In order to strengthen and refine some technical procedures specific to soccer, at the female players aged 13-15, we introduced a series of motor games and relay races within the training hours.

Twenty-four athletes aged between 13 and 15 participated in the experiment, components of the football team of the N. Tonitza Secondary School - Constanta. Based on the results of the initial testing, the female soccer players were divided into two homogeneous groups - experimental and control (N=12).

In the experimental group, motion games and relay races prevailed in the training program.

To highlight the technical level of female soccer players, we used 4 tests, namely:

- juggling;
- cone dribbling;
- accuracy in passing the ball;
- shoot accuracy.

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Descriptive statistics (means and standard deviations) were counted for all the variables of the study. In the statistical analysis of the data, we considered the minimum significance threshold for $p = 0,05$.

Results and discussion

The statistical analysis between the initial and the final testing revealed significant progress in the experimental group on all four tests: ball possession, cone dribbling, accuracy in passing the ball, shoot accuracy.

The control group achieved significantly better results in final testing than in the initial test, but only in the ‘accuracy of passing the ball’.

Table no. 1 shows the average results recorded in the ‘**juggling with the basic foot**’. The statistical analysis showed that there are no significant differences between the values of the two groups at the initial testing ($t = 0.619$, $p > 0.05$). On the other hand, in the final testing, the experimental group recorded significantly better values ($t = 4.347$, $p < 0.01$). Other authors have also found increases in this parameter after different periods of training - Vaeyens, R., Malina, R.M., Janssens, M. et al, 2006, Gidu D.V. et al 2017. Stanculescu et al, 2012 find similar results in beginners female soccer players.

Table no. 1: Values recorded at the ‘ball possession’ index in the initial and final testing

Tested parameter	Group	Initial testing	Final testing
Juggling with the basic foot (nr. of juggling/min)	Exper.	20.30 ± 1.26	28.85 ± 2.36*
	Control	20.00 ± 1.24	21.10 ± 1.52

* - significantly different $p < 0.001$

In the “**cone dribbling**” (Table no. 2) the statistical analyses showed that there is no significant difference between the values of the two groups at the initial testing ($t = 1.218$, $p > 0.05$).

In the final testing, there were no statistically significant differences between the two groups ($t = 0.357$, $p > 0.05$). The results obtained by the two groups were 12.00 ± 0.39 sec in the experimental group, and 11.95 ± 0.39 sec in the control group. Rebelo A. et al (2013) recorded post-experiment better values for this type of testing, but the girls they had as subjects were older than ours – WU19, compared to WU16.

Gråstén, A., Forsman, H., Mainsbridge, C. (2018) find that girls achieved similar dribbling scores as boys at the baseline more than two years later.

Table no. 2: Values recorded at the ‘cone dribbling’ index in the initial and final testing

Tested parameter	Group	Initial testing	Final testing
Cone dribbling (sec)	Exper.	12.28 ± 0.20	12.00 ± 0.39
	Control	12.16 ± 0.29	11.95 ± 0.39

In the test of “**accuracy in passing the ball**”, the statistical analysis showed that there are no significant differences between the values recorded by the two groups at the initial testing ($t = 0.00$, $p > 0.05$).

On the other hand, in the final testing, the experimental group recorded significant differences compared to the control group ($t = 9.581$, $p < 0.001$). Gioldasis, A., Souglis, A., Christofilakis, O. (2017) found, about this parameter, that female wingers performed better than central defenders. Some studies have shown that passing skills have a tendency to improve with age (Forsman et al., 2015b; Vänttinen, 2013) with boys performing better than girls (Forsman *et al.*, 2015a; Vänttinen, 2013). According to Huijgen *et al.*, 2010, the result in the passing test were better at the fin of the experiment, but his experiment was for a period of 2.5 years.

Table no. 3: Values recorded at the ‘accuracy in passing the ball’ index in the initial and final testing

Tested parameter	Group	Initial testing	Final testing
Accuracy in passing the ball (no. out of 10 executions)	Exper.	3.80 ± 0.83	7.75 ± 0.78*
	Control	3.80 ± 0.78	5.20 ± 0.63

* - significantly different $p < 0.001$

Table no. 4 shows the average results recorded in the “**long-distance shots**”. In the initial testing, the statistical analysis showed that there are no significant differences between the values of the two groups ($t = 0.262$, $p > 0.05$).

In the final testing, there were statistically significant differences between the two groups ($t = 3.908$, $p < 0.01$).

Such significant results in this parameter were also recorded by Gidu D.V., et al 2017, and Gioldasis, A., Souglis, A., Christofilakis, O. (2017) found, about this parameter, that female midfielders and forwards performed the highest scores in long pass.

Table no. 4: Values recorded at 'long-distance shot' index in the initial and final testing

Tested parameter	Group	Initial testing	Final testing
Long-distance shot (m)	Exper.	14.65 ± 2.56	16.72 ± 1.34*
	Control	14.82 ± 0.96	15.20 ± 0.78

* - significantly different $p < 0.001$

Conclusions

The statistical analysis revealed that the experimental group made significant progress on all four tests: ball possession, cone dribbling, the accuracy in passing the ball and the long-distance shot.

Therefore, the working hypothesis has been verified - the use of relay races and motion games in the training of the representative school team of female soccer players has led to the improvement of the technical skills in the experimental group.

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The Road to Performance From Average to Elite: An Integrative Approach to Male Representatives of the Eureka-Iku Romanian National Karate Team Specific Training

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Abstract

An integrative approach consisting of combining physical conditioning with specific training sessions will lead to the specific required skills development and to gain the optimum physical conditioning in karate athletes. *The study aim was:* evaluation of the physical performance added value obtained by integration of modern training methods into the specific karate training program. *Material and Methods:* all training methods envisaged to increase the physical performance of all 7 karatekas during a 3 month evaluation period by developing the speed, power, agility and physical condition. The evaluated parameters were, as follows: I) *plyometric training:* the horizontal jump length; the drop jump amplitude; the alternative jumps and push-ups reps.; II) *TRX & RIP training circuits:* the number of reps for: *TRX:* squat, single leg squat, crossing balance lunge, push-ups, atomic push-ups; *RIP:* punch, overhead axe chop; paddleboard row, jump row; III) crunches and IV) rope jumps. *Results:* The progress has been evaluated at the end of the study, each parameter being considered both control and measure of progress. The statistical data analysis revealed a significant increase of physical performance in all participants considered both separately and as a group. The results obtained in all TRX&RIP circuits presented an extremely significant increment of resistance performance (50% increase, $p < 0,001$) and a global augmentation of physical performance for at least 30%. For Plyometric training, it has been found a significant improvement of the performance from 5% for the horizontal jump length ($p < 0.05$) up to 30% for the push-ups ($p < 0.001$). *Conclusion.* To succeed on the road to performance and become elite, the adjuvant training methods have to be integrated in specific karate training. Considering these results a primary milestone in the personal development journey, further research has to be done, to establish the best protocols of training in order to achieve greatness.

Keywords: karate specific training; TRX; RIP; Plyometric training; physical performance;

Introduction

First of all, karate is an art. Second of all karate is a way of life (Funakoshi, 2013). However, within the last decades this martial art gained also another dimension as a competitive sport with thousands of adepts worldwide. Getting over the Hollywood dimension, promoted by the B series movies or by the narrow approach of some profanes that consider karate just a collection of techniques meant to be used only to break through a brick wall we have to appreciate it for what karate really is: discipline, honor, humbleness and last but not least hard work. Thus, nowadays karate is a trivalent discipline which respects the ancient samurai honor code, able to influence the athletes to become better not only as karateka but also as human beings (Funakoshi, 2005).

It is known that for being a top athlete, all karateka have to be very well determined to obtain their best sportive shape. This is due to the richness of the specific sport events organized both during national and international competing seasons. Therefore, to have a busy but successful season, implies the achievement and, most important, the maintenance of a great physical and technical condition, the best mind-set and determination. But all these cannot be achieved without a very well strategy aimed to develop all athletes' physical and mental native qualities. An integrative approach consisting of combining physical conditioning with specific training sessions will lead to the development of the required skills in all top karate athletes. When this approach respects also the scientific discoveries in the field, will be more helpful because the top athletes will achieve their best in a greater and a faster manner than the average ones. Coming back to the sportive dimension of karate, it is well known that an open mind vision considering the training strategy becomes a must for all the actors involved in this play, if remarkable results are envisaged. To win,

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represents the goal for each active athlete; and sportive karateka are athletes. So, the training strategy has to include both traditional and modern methods. If traditional method is known to be the representative for the Sensei's vision about the karate phenomenon, the modern methods have to respect the scientific research results considering the development of the required parameters in order to obtain optimum results. Considering this, practicing karate in a scientific manner will make the difference between the school backyard celebrity and the real performer. To accomplish this goal the training has to be adapted both to their actual physical performance and also to follow a very well established strategy oriented to gain the optimum physical conditioning. *The aim of the study* consisted of the evaluation of the modern methods (such as Plyometric, TRX & RIP circuits), effect on physical performance when integrated in specific karate training of the male representatives of the EUREKA-IKU Romanian National Karate Team.

Material and Methods

The investigated group has to respect the main inclusion and exclusion criteria as follows:

Inclusion criteria- all athletes have to be:

- components of the Eureka-IKU Romanian National Karate team;
- male representatives of the Eureka-IKU Romanian National Karate team;
- in the Senior category of age (21-35 years);
- compliant and participate to minimum 90% of TRX, RIP and Plyometric training sessions

Exclusion criteria:

- missing more than 10% of TRX, RIP and Plyometric training sessions;
- unexpected illness or injuries.

Thus, considering all the above, our investigated group consisted of 7 male athletes, components of the Eureka-IKU Romanian National Karate team, in the Senior category. All the subjects participated at all training sessions and haven't suffered any injuries or unexpected illness episodes.

The training sessions took place at the Timisoara West University, in a gym hall that respects all the standards for this kind of training. For TRX and RIP training sessions have been used standard equipment (certified by Fitness Always LLC, USA) and for the Plyometric sessions it has been used the gym floor and the horizontal gymnastic bench.

The study consisted of 2 sets of 3 months training periods, when it has been evaluated the performance obtained by the karateka when performed TRX and RIP and Plyometric training respectively.

The design of the *TRX and RIP training sessions* included 5 circuits. Each TRX-RIP circuit consisted of 4 generic stations where the imposed elements have been performed according to each circuit. *For Plyometric method* the design of the training consisted of 4 stations also. In order to maintain the minimum evaluation error range the same external observer and data collector has been assigned to evaluate each athlete's performance for all circuits at both evaluation moments.

Results

For each athlete the performance has been evaluated at two designated moments initially- at the beginning of the study and at the end of the 3 month evaluation period. Thus, each athlete's performance represented both control and experimental data. The results have been analyzed both as a group – when the performance and the progress have been evaluated globally and as an individual result– when personal progress has been evaluated. For the global evaluation the results have been expressed as mean value \pm SEM (standard error of mean) and for personal evaluation the results have been expressed normalized (as difference percentage from Control considered as 100%).

The statistical data analysis have been realized using a statistical software (GraphPad Prism 5.0). The statistical significance has been considered for values of $p < 0.05$. The individual progress is presented in table 1 as percentage value.

Table 1. Individual progress in TRX-Rip circuits

C	TRX-RIP Individual progress (%)													
	S1							S2						
C1	A1	A2	A3	A4	A5	A6	A7	A1	A2	A3	A4	A5	A6	A7
	32.8	43.9	45.1	37.1	65.5	50	65.5	69.2	46.	61.1	46.7	84.0	64.8	61.6
C2	A1	A2	A3	A4	A5	A6	A7	A1	A2	A3	A4	A5	A6	A7
	40.9	43.9	55.1	45.4	77.7	54.8	71.4	69.2	46.6	61.1	62.5	91.6	71.1	67.2
C3	A1	A2	A3	A4	A5	A6	A7	A1	A2	A3	A4	A5	A6	A7
	41.9	40.3	38.7	41.9	70.0	50	62.5	78.85	60.34	76.92	77.78	76.92	86.00	77.78
C4	A1	A2	A3	A4	A5	A6	A7	A1	A2	A3	A4	A5	A6	A7
	59.2	63.4	75.0	61.1	76.0	57.6	63.4	82.69	68.52	80	80	82	75	78.85
C5	A1	A2	A3	A4	A5	A6	A7	A1	A2	A3	A4	A5	A6	A7
	33.3	33.3	50	37.8	70.3	43.5	73.2	82.69	60.00	66.67	76.79	97.92	82.69	74.14
C1-C5	S3							S4						
	A1	A2	A3	A4	A5	A6	A7	A1	A2	A3	A4	A5	A6	A7
	33.0	29.1	31.9	27.4	32.7	33.1	31.06	22.10	21.69	20.24	18.39	21.29	16.85	19.60

For each athlete the initial evaluation has been considered his own control and the final evaluation has been assigned as his progress. For both evaluation moments the reference data has been considered the mean value of all determinations. After this initial standardization we considered that by normalizing the results we obtain more accurate data. Thus, the initial evaluation has been considered Control and it has been assigned with a value of 100% and the final evaluation has been considered the performance augmentation, also expressed as percentage from control. The progress has been assigned as the difference between the final and initial results. For each athlete the statistical significance has been evaluated using Student-t test.

Analyzing the data we observed that all subjects increased their individual performance with at least 30% comparing to control ($p < 0.001$) in TRX station. The main improvement has been obtained in Station 2- RIP, where the minimum performance augmentation was at least 46% ($p < 0.001$). For Station 3 – rope jumping the results also revealed an extremely significant performance augmentation for minimum 27% compared to control. The minimum performance augmentation has been observed in Station 4- Crunches comparing with the rest of the stations but even for this station each athlete increased his performance compared to his initial evaluation ($p < 0.001$). This suggests that physical conditioning regarding this specific type of exercises has been better achieved by the athletes during their years of practice, when only classic training has been performed. Even so, by integrating the crunches in a circuit we could demonstrate that there was a reserve regarding the core physical conditioning. By evaluating the global performance of each athlete it has been revealed that all subjects have improved their global resistance performance with at least 50% ($p < 0.001$).

Figure 1 depicts the statistically significance regarding the global performance for TRX-RIP training sessions. It has been presented the comparison of the results obtained by the entire group at initial and final evaluation moments. It can be observed an extremely significant improvement of the performance ($p < 0.001$) in all stations, in all circuits, which suggests that introducing the modern methods within the specific training added a plus value in physical conditioning of the participants. By comparing (ANOVA) the data regarding S3 - Rope jumping and S4- Crunches in all participants, a very interesting result has been revealed. There was no significant difference between the performance in the above mentioned stations neither in relations with the circuit nor regarding the athlete’s results. Thus, we considered that for those two stations we can also evaluate the performance globally by analyzing all the results as a pool data for each station using the *t-Student test* (data showed in figure 1).

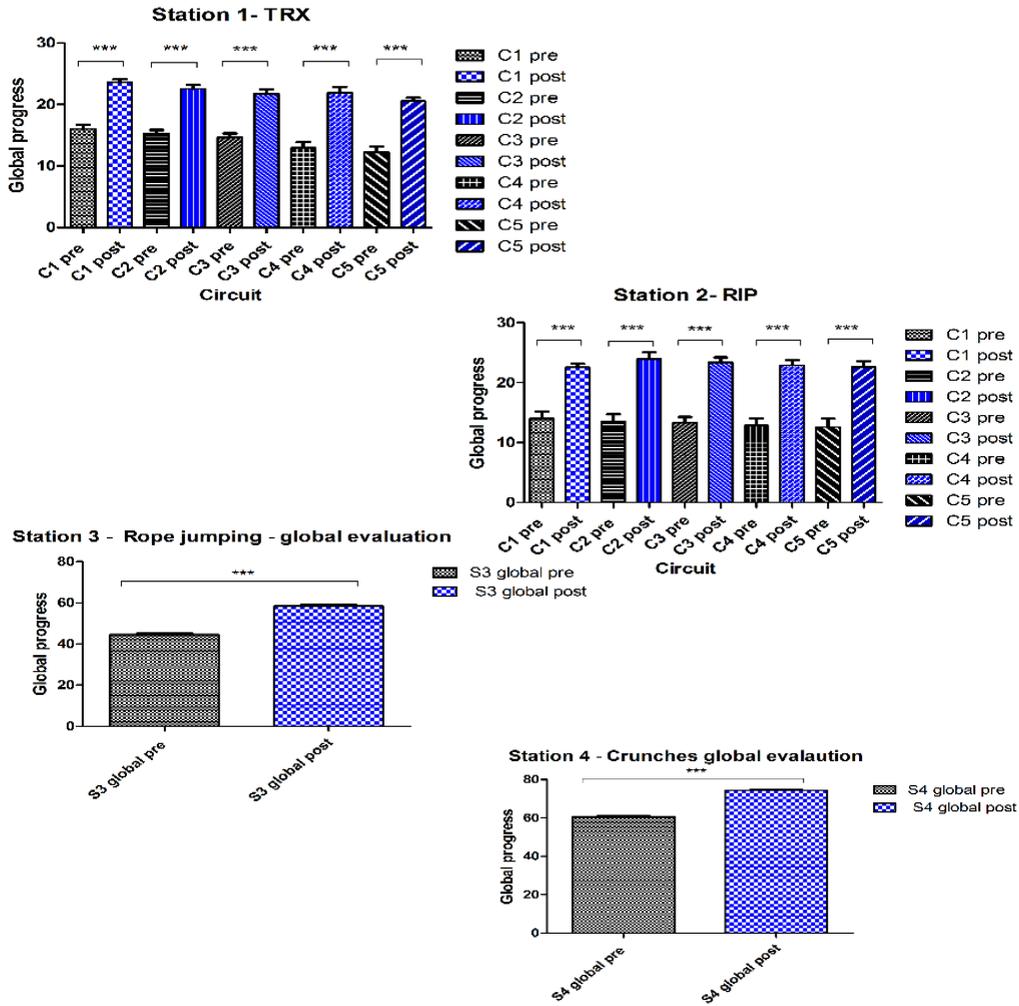


Fig. 1. Global results in TRX-RIP training sessions

For Plyometric training session's individual progress is presented as percentage from control in tables 2 and 3.

Table 2. Individual progress in plyometric training sessions
Plyometric training individual progress (%)

	S1							S2						
Progress (%)	A1	A2	A3	A4	A5	A6	A7	A1	A2	A3	A4	A5	A6	A7
	4.76	4.05	3.50	4.50	5.15	5.8	5.13	13.2	14.3	10.5	2.9	8.3	10	6.9
	S3							S4						
Progress (%)	A1	A2	A3	A4	A5	A6	A7	A1	A2	A3	A4	A5	A6	A7
	14.3	5.6	9.4	9.4	6.7	13.8	11.1	30.77	40	40	30	36.3	33.3	33.3

Table3. Global progress in plyometric training sessions

Plyometric training global progress					
Progress	S1		S2		
	Mean	S1P-Pre 2.016	S1P-post 2.11	S2P-Pre 34.43	S2P-post 37.71
SEM	0.041	0.04	1.36	1.71	
Progress	S3		S4		
	Mean	S3P-Pre 30.57	S3P-post 33.57	S4P-Pre 9.85	S4P-post 13.43
SEM	1.15	0.9	0.59	0.68	

In figure 2 there are presented the significant difference regarding the global performance for Plyometric training sessions. The comparisons of the results between the designated evaluation moments revealed a significant improvement of the performance from a mean value of 5% for the horizontal jump length ($p < 0.05$) up to a mean value of 9% for drop jump ($p < 0.01$), 10% for alternative jump ($p < 0.001$) and over 30% for the push-ups ($p < 0.001$)

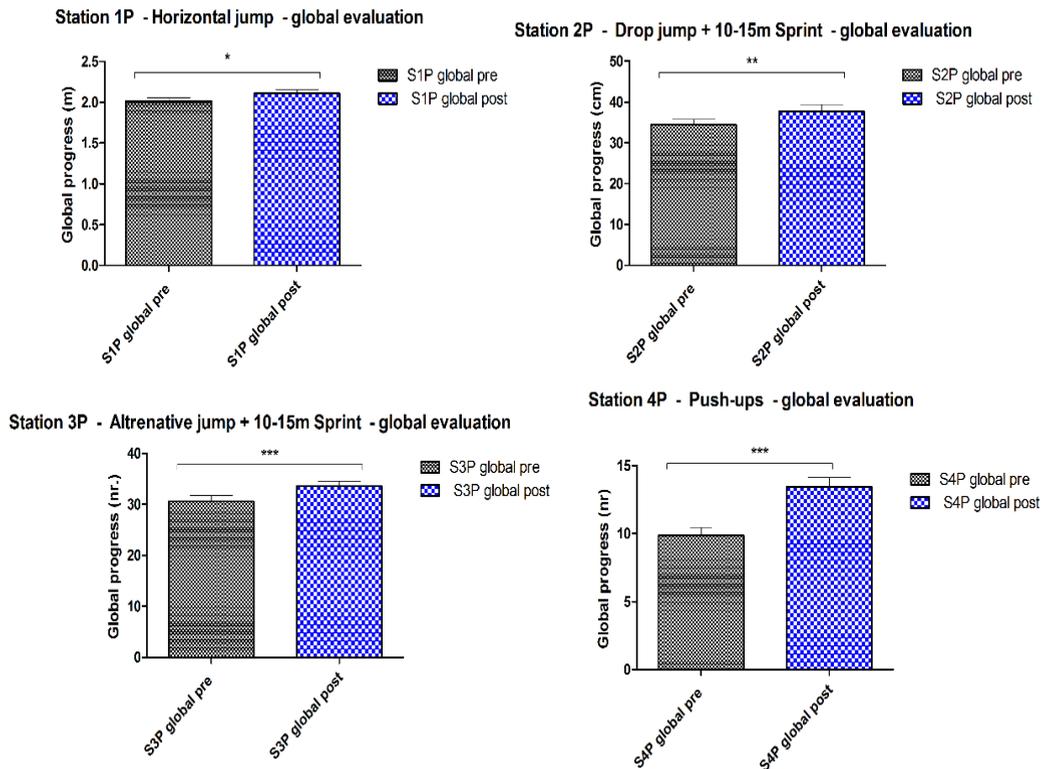


Fig. 2. Global results in Plyometric training sessions

Discussions

The research studies conducted during the last decades revealed that in young adults and sports players the functional training improved the power, muscular strength (Danelli et al., 2011; Prokopy at al., 2008), balance speed, and stabilization (Kim et al., 2013; Pedersen et al., 2006), agility and general physical condition (Beekley, 2006). Considering that all these parameters are also important for the elite karateka physical conditioning, the introduction of these modern methods of functional training TRX, RIP and Plyometric within their training sessions has to have the same effect on physical performance, especially because these methods will respect the minimum load of the muscles during the training sessions (Gargariet. al, 2014). Organized training, mostly with athlete’s own weight, determines the body to become more agile when moving within different plans because of specific neuromuscular responses developed as an answer to a requested task, according to the theme of the exercise. Radcliffes, J. in 2003 and Shajjiand&Isha in 2009 revealed that these methods induce the improvement of sports performance by increasing

the explosive power, speed and vertical jump in sports based on the process of stretching and shortening of the muscle. Our results also confirmed that integrating these modern methods increase the both individual and group performance of the athletes. By integrating the TRX, RIP and Plyometric methods within the specific karate training, we envisaged to increase the athlete's general physical conditioning. But the obtained results in all TRX&RIP circuits characterized by an augmentation of the resistance performance with about 50% comparing with the beginning of the study and a global augmentation of physical performance for at least 30% exceeded our expectations simultaneously convincing us that integration of this method in specific training has to become habitual. For Plyometric training, the results have a similar outcome: a significant improvement of the performance for all parameters. By applying the established protocols we have been able to obtain a significant augmentation of the general physical conditioning both for each athlete and also as a group. As a practical observation, all the athletes of National Romanian Eureka –IKU Karate Team had a better physical compliance during the last major Championships (World, National and European) that took place within the last competition year (2017-2018) comparing to other events, which can be related to the integration of these modern methods in their training schedule. This indicates that introduction of modern methods within the specific karate training is salutary and has to become a habit in a long term training strategy. It would benefit to introduce these modern training methods for a period of at least 3 months (the period covered by this study) prior major competitions.

Conclusion

To succeed on the road to performance and become elite, the adjuvant training methods have to be integrated in specific karate training. Considering these results a primary milestone in the personal development journey, further research has to be done, to establish the best protocols of training in order to achieve greatness.

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The Communicative Skills of Sports Students in Studying English

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Abstract

Studying a foreign language of largest circulation, such as English, contributes a lot to the training of students in the field of sport by exploring different areas of socio-cultural life reflected in different contents, favouring, to a great extent, the definition of the students' own interests and reasons for professional choices. Training the students communicative skills from sports faculties based on English learning is a priority, because, through the knowledge of this language, the student gets familiar with the sociocultural framework of the country, the language to which he/she learns, which contributes to his assertion as a specialist in the future.

The requirements of the society in which the sports students are subsequently assigned to perform professional activities are getting wider. Communication means the process of interaction between individuals where there is an exchange of information, thoughts, ideas, attitudes, emotions, etc. Communication, at the same time, presupposes the volition and ability to analyze, argue, interpret and produce messages. Studying a professional language contributes to the development of professional abilities and attitudes by exploring the fields of other disciplines with diverse content. There is a need to develop a model for the communication competence training in English of students in the field of physical culture. It is worth noting that by learning a foreign language, students acquire knowledge which will allow them to understand and appreciate another culture, to broaden their spectrum career prospects. To all these things, will be added to the motivation of students influenced and partly controlled by volition. Robert Lado, 1976 argues that "a strong motivation will increase learning outcomes." Due to the fact that human is a social being his desire to communicate is a factor that enhances language learning. Moreover, the sports student should know that he is learning a foreign language for his own benefit for his professional future.

Keywords: sports students, English, communicative skills

Introduction

The study of English is more a necessity than a tendency or preference. The interest in learning and knowing it is determined by global issues: globalization, interculturality, the need to educate personalities who agree to live in a diverse, multi-coloured and tolerant society, to understand people representing different cultures, while ensuring the progress and prosperity of national culture. Learning English is not only about acquiring vocabulary and phonetic, morphological, grammatical, semantic structures, but also about new ways and methods of thinking, reflection, visions and philosophies on life.

In the Republic of Moldova, the issue of communication skill was studied by Vl. Pâslaru, T. Callo, M. Hadârcă, A. Solcan, L. Sadovei. Aspects of curricular reform in the perspective of curricular development are addressed in the studies signed by C. Callo, N. Silistraru, Vl. Pslaru, Vl. Guțu, L. Botnarciuc, A. Solcan, A. Afanas, L. Sadovei, S. Titica, A. Ixari, M. Pruteanu, authors who developed a curriculum concept based on the educational objectives and promoted it in context of curriculum development (Guțu Vl., 2007).

Communication in foreign languages generally covers the basic skills described in the communication in the mother tongue. In addition, it is based on the ability to understand, express and interpret concepts, thoughts, feelings, facts and opinions both in oral and written form (listened, spoken, read, written) in appropriate social and cultural contexts (in education and training, workplace, leisure) about someone's wishes and needs. Communication in foreign languages requires skills such as mediation, intercultural understanding. The advanced level of knowledge varies between the four dimensions (listened, spoken, read, written) and between different languages, in accordance with the social and cultural background of the individual, the environment, his / her needs and / or interests (Roland Viaul, 2006).

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The biggest problem faced by English teachers in teaching is the issue of motivation, the interest of young people in education. Motivation is an internal state that causes behavior, representing the set of dynamic factors that characterize the individual. Motivation has the character of an energy catalyst, but also its targeting function. Learning motivation focuses on the totality of factors that mobilize the student to achieve educational actions. The motivation of sports students studying English may be different. From a behavioral perspective, the source of motivation is the consequences of previous behaviors; from a cognitivist perspective, the source of motivation is the strengthening and internal structure (mental schemes, beliefs); from a constructivist perspective, the source of motivation is the curiosity of the sport student, his ability to control the external environment. (Nastas N., 2017)

Sports students' motivation is such an important factor in language learning that no teacher can ignore this essential aspect of the methodical and educational approach. Among the factors that favour language learning, the following can be mentioned: aptitude for learning these languages, student intelligence, perseverance or motivation, the role of programs and textbooks, the role of language teacher (Cusen, M., 2000).

When examining language learning, we note that motivation is analysed in different terms from other subjects. The student learns either from parents' desire to master a foreign language or from their own desire to achieve outstanding results. The end, however, remains the mastery of language as a means of communication in various situations of everyday life, learning which remains artificial anyway and to which the teacher must apply his imprint of authenticity.

In the opinion of the authors John Nicholls, Carol Dweck, Martin Covington, etc. The orientation towards an objective is the motivational basis for achieving a certain target (e.g. to learn to get good marks for the exam or to improve the knowledge). They argue that the first motivator of the achievement / success behaviour is the desire to demonstrate a high ability or to avoid negative ratings of skill. Covington M., on the other hand, states that individuals are motivated by the desire to maintain their sense of self-worth (Elliot, A.J. & Dweck, C.S., 2005).

Television, radio, international tourism, and international exchanges make students aware of the need to learn and master at least one foreign language in this dynamic world where barriers seem to give the way to a steady communication process but where it remains the last barrier of the past, most resilient, of language as a means of communication. Language learning based on communication has unquestionable advantages, including:

1. DEVELOPMENT OF THE STUDENTS EXPRESSING MEANS, with beneficial effects on the mastery of the mother tongue.
2. Develops the cultural dignity of students, revealing new ways of life and other cultural values spoken by the learned language.
3. On a moral and human basis, communication-based methods create and develop a spirit of tolerance and openness, of which our current awareness is all conscious. In order to achieve these goals, a good curriculum of a foreign language must propose three specific strategic objectives:
 - a communication objective;
 - a linguistic goal of reflection on the language in which we teach students to communicate and, at the same time, comparative reflection on the mother tongue;
 - a cultural objective without which the student's new ability to communicate would run the risk of being empty.

The aim of the research is to establish the pedagogical and psychological aspects of the elaboration of the pedagogical model of communication skill in English to the future specialists in the field of physical culture.

Research objectives:

- approaching theory and practice on the formation of communicative, foreign language skills in the academic education process;
- revealing the motivation for the formation of communication skills to students in the process of teaching / learning English;
- elaboration of the pedagogical model for the formation of communicative skills in

English Language

Methodology of research *analysis and generalization of specialized literature data, study of working documentation, pedagogical observation.*

Studying a professional language contributes to the development of professional abilities and attitudes by exploring the fields of other disciplines with diverse content. In the process of teaching / learning professional English, professional skill develops, and by reporting individual situations of learning, reception and production, typical of foreign languages, to those of the mother tongue, a unitary conception is created about the functioning language as a primary element of communication. In this respect, there is a need to develop a model for the English language communication skills of students in the field of physical culture (Cazacu T. & Frunze L., 2012).

It is worth noting that by learning a foreign language, students acquire knowledge which will enable them to understand and appreciate another general and professional culture, to broaden their career prospects.

Teaching a foreign language in educational institutions is gaining increasing social significance. In the context of globalization and integration, almost all spheres of human activities that lead to the blurring of national borders and the free migration of people from one country to another, language learning, at least one, is not only a measure of human education and is a practical necessity. Moreover, such a migration of people is far less likely to lead to the abandonment of their traditional cultural and linguistic identity, thus becoming more common in the world is a phenomenon of bilingualism when a person moves freely from one another, from one language to another, depending on the particular circumstances and purpose of the communication. According to foreign language teaching should promote the skills of free bilingual switching of mother tongue into a foreign language in a variety of communication situations. This is particularly important for professionals because different forms of cooperation with foreign colleagues are common in many areas of professional activity. In particular, in sports, especially in team sports, the practice of inviting foreign athletes to the team today in the world is already common. The international composition of the teams is today typical for sports clubs and organizations in the country. As a result, coaches and athletes and other sports experts in our country must be prepared to communicate bilingually in professional sports activities.

The practice of teaching English at the faculty of physical education suggests that sports students face great difficulty in implementing oral and verbal communication in English, both in the professional sphere and in the social sphere. Traditional methods of teaching a foreign language under physical education faculties have been found not to be effective enough to provide students with the communication skills needed to communicate in a foreign area. The textbooks used in the faculty of physical education are, as a rule, not suitable for professional training purposes, contains a sufficient volume of professional specific terminology.

The linguistic-language teaching concept of foreign language teaching for future specialists in the field of sport requires the formation of foreign communication skills necessary for professional communication in a foreign language under the conditions of professional activity.

One of the distinctive features of the athletes' speech is the use of a large number of sports terms.

In order to successfully implement the communication skills acquired in the process of studying the foreign language discipline, students must have at least the basic elements of the daily general culture language "Anglophones" as basic English communication concepts with different cultures.

An important component of communication skill is linguistic competence, which is "the ability to use appropriately formulated linguistic tools that carry a certain sense of proposition."

In terms of linguistic skill, notions such as:

- a) lexical skill;
- b) grammar skill;
- c) semantic skill;

Knowing a foreign language is now not only prestigious but necessary to the sport specialist. The intensive development of international sports contacts, the growing competition of foreign rivals in international competitions. Expansion of scientific relations, on-site visits abroad to study the experience of colleagues from abroad, to participate in international scientific symposiums, conferences also increases the demand for foreign language. In this respect, there are increased requirements for the level of linguistic training for sports professionals. (Nastas N., 2017).

Conclusion

Therefore, the chosen documents and the methods used, as well as the evaluation system, will contribute to the development of communication skills. All of this will add motivation to students influenced and partly controlled by will. Robert Lado argues that "strong motivation will increase learning outcomes." (1976). Due to the fact that man is a social being, his desire to communicate is a factor that enhances language learning. Moreover, the student should know that he is learning a foreign language for his own benefit for his professional future.

The foreign language is needed by the future sports specialist not only as a means of selecting scientific information but also as a means of communication (in exchange of experience, in international competitions, for personal contacts, etc.).

The training of English professional language of students from State University of Physical Education and Sport helps to know and apply the sport-pedagogical language, to the formation of general and special cognitive skills, on the basis of which they will carry out the educational activity according to the requirements of the modernized curriculum for physical education.

Thus, the process of training and learning the professional English gains in significance to the sports students' by constantly reporting to social practices and concrete contexts of exercising acquired skills. Learning becomes a clear,

targeted process that increases motivation for action. Skills mobilize the student's previous purchases, providing concrete opportunities for the learning process to develop skills, which enhances students' motivation for learning English. Focusing on the final purchases of training offers freedom in capitalizing on different learning styles, strategies and modern technologies to train the future sports specialist.

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Incidence of Aphasia in Neurological Patients

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Abstract

Aphasia represents a brain-caused defect in the perception of words and it affects over five million people worldwide. The pathological language alteration under the form of aphasia is an infirmity consecutive to brain lesions at the level of speech centres in the brain.

The purpose of the paper was to identify the incidence of aphasia in neurological patients.

The sample of patients was selected through data from the archive of the “Prof. Dr. Nicolae Oblu” Clinical Emergency Hospital in Iași.

Material and method: the study was carried out using the Microsoft Excel program, which helped us obtain data regarding the prevalence of aphasia within neurological pathology.

Conclusion: monitoring this phenomenon in the subsequent years, we may be able to highlight the occurrence of strokes associated with speech impairments.

Keywords: pathology; deficit; infirmity; brain lesion.

Introduction

The analysis of various types of disabilities (mental, physical, sensory, of language or associated) involves an interdisciplinary approach, using concepts in the field of general medicine, psychiatry, neurology, psychology, pedagogy, genetics, sociology, etc (Cozma T., Gherguț A., 2000 apud Ungurean B.C., et., al.).

Aphasia represents a speech disorder and it may emerge after a stroke occurred in the dominant brain hemisphere, thus damaging that part of the brain that concerns language expression and understanding. This disorder makes the patient unable to speak, and often it affects the capacity of understanding uttered or written words.

Aphasic patients with stroke may pronounce certain sounds and understand what is spoken, but they have no control over their own words. In other situations, they are able to articulate a word, but they may be unable to utter another.

Depending on the area of the brain impaired and on the gravity of the stroke, several types of aphasia may be encountered. Thus, it can be expressive (Broca’s aphasia) when a person knows what they want to express but find it difficult to express themselves; receptive (Wernike’s aphasia), when a patient can hear the voice and read a text, but they fail to understand the sense of the message. In addition, there is also amnesic aphasia, where a patient struggles to find the right words; this is the mildest form. On the other hand, global aphasia represents the most severe form, occurring after a stroke, manifested by an inability to write, read and understand words.

Most people who acquire aphasia are in late or middle years. A stroke occurs when the brain is unable to receive blood supply (Azhar A., et. al., 2017; Braniste T., Arsenescu-Georgescu C., Braniste G., Dorgan V., 2018).

One third of all stroke survivors have a communication disorder that impairs their ability to produce or understand language (Chu C.H., et. al., 2018).

Impairment in language skills due to aphasia typically leads to problems in verbal expression, auditory comprehension, reading, and writing (Spaccavento S., et. al., 2017).

Stroke imaging has greatly contributed to our current understanding of the anatomy of higher cognitive functions, including language (Forkel J.F & Catani M., 2018).

Traditional research in aphasia has predominantly focused on the role of brain regions specialized for language, however a growing body of lesion and neuroimaging research now recognizes that language is part of an extensive

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network of connected brain regions that subserve not only language, but processes such as working memory and cognitive control (Vallila-Rohter S., & Kiran S., 2013).

It is well-known that individuals with right hemispheric strokes tend to have some degree of deficit in attention and visual-spatial recognition, but less amount of literature are present regarding the nonlinguistic cognitive deficits of patients with left hemisphere stroke (Boram L., Sung-Bom P., 2014).

Following stroke, participation in professional, social, and family environments is often limited by acquired deficits affecting motor control, sensation, cognition, and communication (Buchwald A., et al., 2018).

A community-based study of primary caregivers of stroke patients showed that those looking after aphasic patients (compared with those looking after non-aphasic patients) had significantly increased caregiver task difficulty, caregiver depressive symptoms, and, more negative stroke-related caregiver outcomes (Doogan C. et. al., 2018).

On an individual level, reintegration into school, work, and family life may be unattainable given human dependence on the spoken word. Social isolation is a devastating and all too common consequence of aphasia (Tippett C.D., et. al., 2014).

Language recovery in patients with aphasia after a stroke is based on restoring and reorganizing the impaired areas of the brain. Due to neuroplasticity, in many cases, language may be restored through constant, perseverant and voluntary actions.

From this perspective, any intensive cognitive-behavioural intervention can maximize the effects of training-induced brain plasticity, which is ultimately a consequence of effective learning. Similarly, multiple repetitions of stimuli or tasks applied during language training, as well as the imitation of language skills modelled by language therapists will enhance learning and re-structuring of residual language networks (Mohr B, 2017).

Material and method

The sample of patients was selected through data from the statistical department of the “Prof. Dr. Nicolae Oblu” Clinical Emergency Hospital in Iași. By analyzing the data, we obtained information regarding the prevalence of aphasia in patients with a stroke. Through the Graphs, we determined the distribution of the number of aphasic patients by gender and age categories (a ten-year period), for the period 2007-2017 and for the year 2017.

Findings

In order to present the research findings, we used Microsoft Excel, in order to generate the representative Graphs of the study.

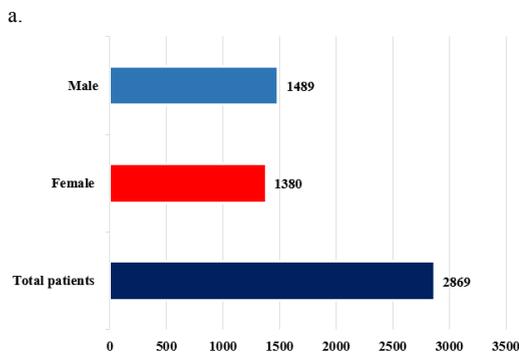


Fig. 1. (a) Patients with aphasia from 2007-2017

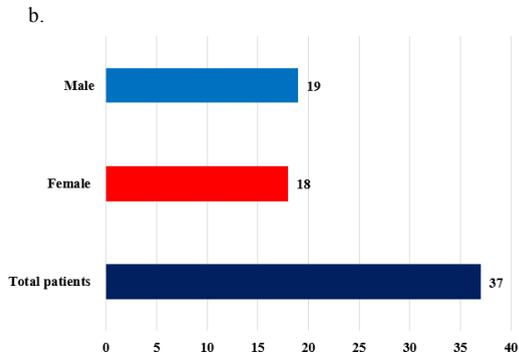


Fig. 1. (b) Patients with aphasia from 2017

Fig. 1. (a) shows that the fact that in the period 2007-2017 a number of 2,869 neurological patients also displayed aphasia after the stroke they had suffered. Out of the total number of patients with aphasia, 1,380 were female and 1,489 male. In 2017, 37 patients with aphasia comprising 18 females and 19 males, according to figure 1 (b).

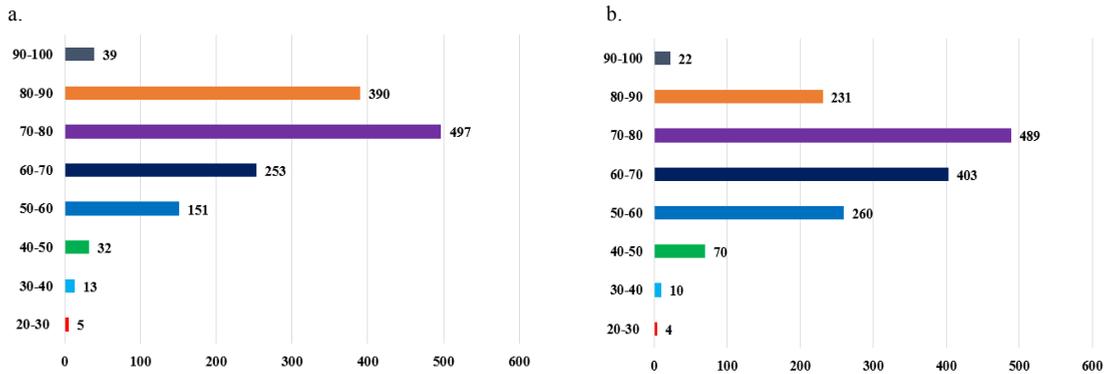


Fig. 2. (a) Female patients with aphasia from 2007-2017 by age category Fig. 2. (b) Male patients with aphasia from 2007-2017 by age category

Fig. 2 (a, b) distributed female and male patients with aphasia in the period 2007-2017 on age categories (10 years old). According to Figure 2 (a), among 1,380 women, the highest number (497 cases) was recorded in the age category of 70-80 years old, with close values to the age category of 80-90 years old, where 390 cases were found. In the age category of 60-70 years old, 253 female patients were identified, and in the category of 50-60 years old, a number of 151 cases were recorded. The lowest values were recorded in the age category of 20-30 years old (5 cases), 30-40 years old (13 cases), 40-50 years old (32 cases), due to the low prevalence of the stroke in these age categories. In addition, a lower number of female aphasic patients were recorded in the age category of 80-90 years old (39 cases).

Concerning the incidence of aphasia in male patients in the period 2007-2017, according to Figure 2 (b), most cases were recorded also in the age category of 70-80 years old, with a number of 489 patients. Unlike female patients, male patients, the second and the third category with the highest incidence of aphasia was 60-70 years old, with a number of 403 cases and 260 cases, respectively, in the category of 50-60 years old. In the category of 80-90 years old, 231 cases were found. A lower number of patients were recorded in the age category of 40-50 years old (70 cases). The lowest values were found in the age category of 20-30 years old (4 cases), 30-40 years old (10 cases), and in the category 90-100 years old, where 22 cases of aphasic patients were highlighted.

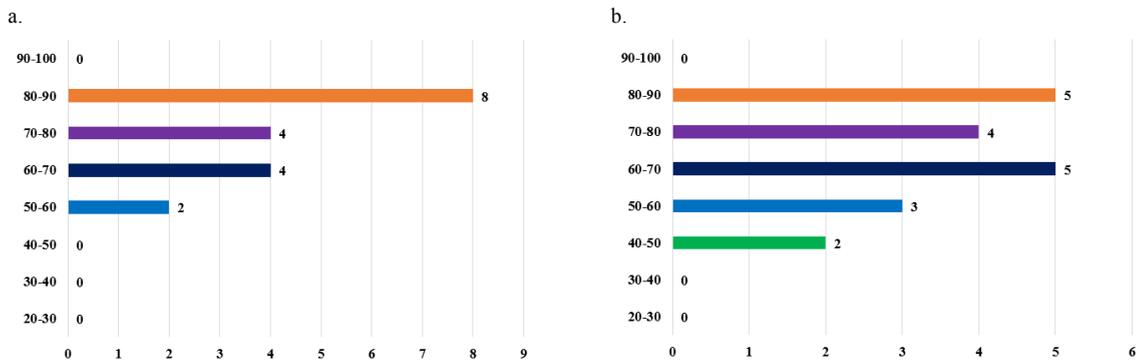


Fig. 3. (a) Female patients with aphasia from 2017 by age category

Fig. 3. (b) Male patients with aphasia from 2017 by age category

Figure 3 (a, b) features the incidence of aphasia in patients with a stroke in 2017 and the repartition by gender and by age categories (10 years old).

According to Figure 3 (a,b), the highest incidence of aphasia in the year 2017 was found in the age category of 80-90 years old for both genders, namely 8 cases in women and 5 cases in men. Furthermore, the following age categories for both genders were those of 70-80 years old with 4 female patients and 4 male patients, 60-70 years old with 4 female cases and 5 male, and the category of 50-60 years old, with 2 female cases and 3 male. It is encouraging that in the categories of 40-50, 30-40, 20-30 years old women, no case of speech disorder was found. The same goes for the age category of 90-100 years old, in both women and men. In addition, among the male categories of 20-30 and 30-40 years old, no other case of aphasia occurred. Unlike the situation of female patients, among men there were 2 cases of aphasic patients in the category of 40-50 years old.

Conclusions

Consequently, it may be stated that this study finds its utility by presenting the situation of the number of aphasic patients with a stroke.

Whereas we cannot discuss an actual conclusive statistical representation, it is beyond doubt that the incidence of aphasia dropped in 2017, especially in the young categories – 20-30 years old and 30-40 years old –, where no patient with aphasia was found.

By monitoring this phenomenon in the subsequent years, we may be able to highlight the occurrence of strokes associated with speech impairments.

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Identification of Interrelations Between the Cultural Dimensions of an Organisation (Sports Camp)

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Abstract

This research aims at identifying the elements of cultural specificities within the Oglinzi Târgu Neamț camp, which concern the following: activity of the manager and of the managerial team, employees' attitude, clients' behaviour (children, students, young people, adolescents, athletes), mental, behavioural, and attitudinal conditions in the context of efforts made to ensure camp functioning.

Cultural differences were analyzed based on criteria that enable comparison. Intercultural Management calls them *cultural dimensions*. I analyzed the overlaps and interferences between these cultural dimensions, in order to highlight the most important aspects and to consider them within my research.

The research series comprises 332 subjects, of whom 34 are represented by the managerial staff of the three camps (14 persons in the Oglinzi camp, 10 persons in the Arted camp, 10 persons in the Muncel camp) and 298 are represented by clients of the three camps (171 persons in the Oglinzi camp, 77 persons in the Arted camp, 50 persons in the Muncel camp). Subjects were both females and males and they were divided by age categories, as follows: the personnel of the three camps into two groups – 20-40 years old (personnel with low or average experience) and 41-60 years old (personnel with high experience), while the clients into two groups: 7-12 years (preadolescents) and 13-18 years old (adolescents).

Results were analyzed qualitatively and quantitatively using SPSS – version 17.

Keywords: cultural dimensions, intercultural, sports camp

Introduction

The identification of interrelations between cultural dimensions is the result of a mixture between the specialized field of researchers, the subsequently developed professional skills, and the newly acquired information within domains that are considered “interdisciplinary.”

Intercultural Management has not “patented” any specific methodological analysis system; to this end, it has used existing methods and techniques, with applicability in management. “Methodology is the know-how used to reach a purpose, a research goal, in particular and in special (Hofstede, 1996). Research methodology has a preponderantly normative character and it comprises theoretical principles (theoretical view of the discipline), data collection methods and techniques (factual and informational support), data processing methods and techniques (dimension of quantitative processing), and logical procedures of analysis and generalization (theory construction and systematization).” (Hoerber, 2010).

Material and method

The methods varied by the aforementioned objectives. To study the evolution over time of an organization such as a sports camp or of its status at a certain point, we had to use research methods that include data and results provision regarding the evolution of the organization; these results lead to a change plan effective for the organization in question. Commercial or non-commercial organizations that aim to develop a sustainable activity in the sports field in Romania are no exception. A reliable direction of founding the strategy is represented by harmonizing the capacities or internal characteristics of a company (strengths, weaknesses) with the external environment where the activity takes place (threats, opportunities (Dumitru, Puni, 2017)).

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We used a series of qualitative and quantitative methods to study the organization and its characteristics, considering that identifiable facts – demonstrable from the perspective of research – constitute a proper support for elaborating intervention plans or decisions, thus avoiding an intuitive or an over oscillating polling.

Because purely quantitative methods are not as precise as they claim and because qualitative methods fail to provide answers to all questions raised by the research issue, the solution was to adopt a middle way, by using both types of methods. (Houlihan,1997)

However, the advantage of quantitative research methods is that they enable the collection of data that describe reality accurately and that may constitute a basis for generalized models (Zaiț,2002). Qualitative or informal methods are commonly used in the research of organizational and management field (Nicolescu, 1997). They enable the highlighting of elements of finesse, such as nonverbal communication, not included within formal methods. The downside of these qualitative methods is that the results obtained are informational and they do not allow the extraction of general conclusions regarding the target-population. According to the analysis model elaborated by Geert Hofstede (Hofstede, 1996)., national culture can be characterized by the five dimensions outlined below:

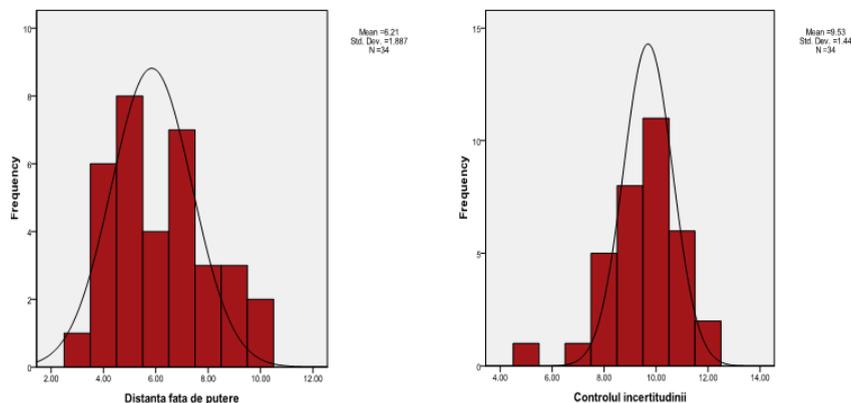
- Power Distance: Large/Low;
- Individualism/Collectivism;
- Masculinity/Femininity;
- Uncertainty Avoidance: Strong/Weak;
- Long Term Orientation versus Short Term Normative Orientation.

The subjects within each researched category (administrative personnel and clients) were asked to fill in two types of questionnaires (personnel – Questionnaire A, while clients – Questionnaire B), in identical or similar evaluating conditions. Subsequently, results were analyzed qualitatively and quantitatively using SPSS – version 17.

We present below the underlying dependent and independent variables of the research:

- dependent variables:
 - Individualism/Collectivism;
 - Power Distance;
 - Uncertainty Avoidance;
 - Long Term Orientation;
 - Masculinity/Femininity.
- independent variables:
 - sports camp: Oglinzi Târgu Neamț, Arted Durău, Muncel Pașcani – Iași;
 - status: employees, clients;
 - sex: male, female;
 - age of employees: 20-40, 41-60/ of clients: 7-12, 13-18;
 - birthplace of employees: Upper Moldavia, Lower Moldavia.

Results



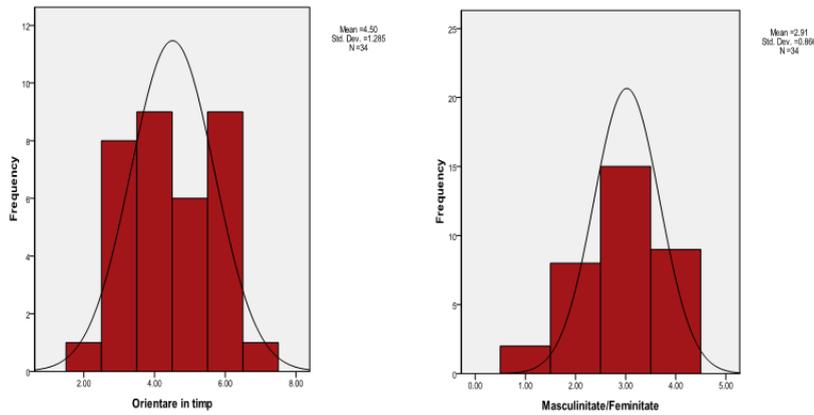


Figure no. 1

Only concerning Individualism/Collectivism, we found a polarization of scores toward the pole represented by Collectivism, because subjects frequently recorded high scores for this dimension. Hence, it can be posited that in the three camps within our study, Collectivism and not Individualism is more likely valued and promoted by employees and management (Knop, , Hoecke, Veerle,2004).

In order to assess potential differences in the approach to cultural dimensions of the management within our study, we used ANOVA One Way. Through, ANOVA we were able to compare means for three and more sub-populations defined by the grouping variable (independent variable). This method enables the extension of the analysis made using the T Test applicable to two means, to situations where independent variables (grouping variable) present three or more categories (in our case, the three sports camps).

Table 1 shows that we found significant differences between the three camps in two of the five cultural dimensions studied: Power Distance (materiality threshold $p < 0.05$) and Long Term Orientation ($p < 0.01$).

Table 1. Comparative analysis of the cultural dimensions in the three camps (Oglinzi –Târgu Neamț, Arted Durău, and Muncel Pașcani - Iași on employee level)

		Sum of Squares	gl	Squared Mean	F	Significance
Power Distance	Between groups	23.230	2	11.615	3.817	.033
	In groups	94.329	31	3.043		
	Total	117.559	33			
Individualism/Collectivism	Between groups	1.936	2	.968	.709	.500
	In groups	42.329	31	1.365		
	Total	44.265	33			
Uncertainty Avoidance	Between groups	11.613	2	5.807	3.166	.056
	In groups	56.857	31	1.834		
	Total	68.471	33			
Long Term Orientation	Between groups	21.086	2	10.543	9.781	.001
	In groups	33.414	31	1.078		
	Total	54.500	33			
Masculinity/Femininity	Between groups	3.207	2	1.603	2.309	.116
	In groups	21.529	31	.694		
	Total	24.735	33			

Because only for these two dimensions significant differences were found between camps, we will analyze the different views of employees within the three camps regarding Power Distance and Long Term Orientation (Table 2).

Table 2. Comparative analysis of the cultural dimensions with significant differences (employees)

Camp		Power Distance	Long Term Orientation
Oglinzi-Tg.Neamt	Mean	6.4286	3.8571
	N	14	14
	Standard deviation	1.82775	1.16732
Arted-Durau	Mean	7.1000	5.7000
	N	10	10
	Standard deviation	1.91195	.82327
Muncel-Iasi	Mean	5.0000	4.2000
	N	10	10
	Standard deviation	1.41421	1.03280

Another aspect on which we focused – besides highlighting the management differences within the three camps – was employees’ perception of the cultural dimensions by age and sex. By using T Test for independent samples for each camp and for the entire employee series within all three, we found no significant differences in employees’ perception of the cultural dimensions by age and gender(Tables 3-6).

Table 3. Grouping employees by age

	Age	N	Mean	Std. deviation	Std. Error mean
Individualism/Collectivism	20-40	20	11.8500	1.22582	.27410
	41-60	14	11.8571	1.09945	.29384
Power Distance	20-40	20	6.2000	2.26181	.50576
	41-60	14	6.2143	1.25137	.33444
Uncertainty Avoidance	20-40	20	9.2500	1.55174	.34698
	41-60	14	9.9286	1.20667	.32250
Long Term Orientation	20-40	20	4.8500	1.38697	.31014
	41-60	14	4.0000	.96077	.25678
Masculinity/Femininity	20-40	20	2.9000	.85224	.19057
	41-60	14	2.9286	.91687	.24505

Table 4. Analysis of age variable (employees)

Levene’s Test for equality of variances T Test– for equal means										
		F	Sign.	F	Sign.	F	Sign.	F	Sign.	
Individualism/Collectivism	For equal variances	.938	.340	-.017	32	.986	0	0.41	-0.84	0.83
	For unequal variances			-.018	29.951	.986	0	0.4	-0.83	0.81
Power Distance	For equal variances	7.584	.010	-.021	32	.983	-0.01	0.67	-1.37	1.35
	For unequal variances			-.024	30.677	.981	-0.01	0.61	-1.25	1.22
Uncertainty Avoidance	For equal variances	.416	.524	-1.370	32	.180	-0.68	0.5	-1.69	0.33
	For unequal variances			-1.432	31.571	.162	-0.68	0.47	-1.64	0.29
Long Term Orientation	For equal variances	4.215	.048	1.980	32	.056	0.85	0.43	-0.02	1.72
	For unequal variances			2.111	32.000	.043	0.85	0.4	0.03	1.67
Masculinity/Femininity	For equal variances	.029	.866	-.093	32	.926	-0.03	0.31	-0.65	0.6
	For unequal variances			-.092	26.778	.927	-0.03	0.31	-0.67	0.61

Table 5 illustrates that no significant differences were found for any of these five cultural dimensions by age (p > 0.05).

Table 5. Grouping employees by sex

	Sex	N	Media	Std. deviation	Std mean of dev.
Individualism/Collectivism	Female	21	11.8571	1.15264	.25153
	Male	13	11.8462	1.21423	.33677
Power Distance	Female	21	6.0952	1.92106	.41921
	Male	13	6.3846	1.89466	.52548
Uncertainty Avoidance	Female	21	9.3333	1.68325	.36732
	Male	13	9.8462	.89872	.24926
Long Term Orientation	Female	21	4.4762	1.24976	.27272
	Male	13	4.5385	1.39137	.38590
Masculinity/Femininity	Female	21	3.0952	.83095	.18133
	Male	13	2.6154	.86972	.24122

Table 6. Variable analysis by sex (employees)

		Levene's Test for equality of variances		T Test- for equal means						
		F	Sign.	F	Sign.	F	Sign.	F	Sign.	F
Individualism/Collectivism	For equal variances	.202	.656	.026	32	.979	.01099	.41506	-8.34453E-1	.85643
	For unequal variances			.026	24.540	.979	.01099	.42033	-8.55520E-1	.87750
Power Distance	For equal variances	.093	.763	-.429	32	.671	.28938	.67447	-1.66324E0	1.08448
	For unequal variances			-.430	25.852	.670	.28938	.67221	-1.67152E0	1.09276
Uncertainty Avoidance	For equal variances	4.062E0	.052	-1.009	32	.320	.51282	.50820	-1.54799E0	.52235
	For unequal variances			-1.155	31.521	.257	.51282	.44390	-1.41756E0	.39192
Long Term Orientation	For equal variances	.339	.565	-.135	32	.893	.06227	.46042	-1.00012E0	.87558
	For unequal variances			-.132	23.468	.896	.06227	.47254	-1.03871E0	.91417
Masculinity/Femininity	For equal variances	.427	.518	1.608	32	.118	.47985	.29845	-1.28070E-1	1.08778
	For unequal variances			1.590	24.668	.125	.47985	.30177	-1.42078E-1	1.10179

Table 7 highlights that no significant differences were found for any of these five cultural dimensions by sex ($p > 0.05$).

Conclusions

In the context of globalization, the managerial work is not only a matter of liaison between states, a simple integration of the clients originated from different countries. It changes the qualitative characteristics of each camp offers which transforms itself from close systems (from a specific geo-cultural area) into universal systems. If is noticed a change in the concept of the camp management by implementing the cultural result; this type of organisation settles its cultural result where it is more suitable for it, without taking into account the problem of borders, departaments, programmes, the service offert transforms into a supplier of (cultural) raw material for the market places (the clients).

Today the universal standars replace the specific particular homogeneity of each camp. Instead of its (cultural) differencies already existing in these forms of organisations, exclusively mutual, now it is about an equability of an infrastructure of „the expansions extent”and of the free programmes, services and ideas on an international scale.

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Recovery of Hiperkyphosis Through Specific Means from Basketball

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Abstract

In the contemporary society, the technology-driven population is inevitably subject to osteo-muscular risks, even if the rate of sedentaryism continues to rise. In 2013, one third of children in Romania suffered from a spinal cord deviation. This worrying childhood statistic draws a concrete alarm signal to find combative solutions to this problem. Often, these conditions are not alone but accompanied by others (osteo-tendinous), and in most cases the body's functioning systems are affected. In children, the use of sports games as a method of relaxation and strengthening of the neuro-muscular system is the way to an optimal functioning of the body. As a result of this reasoning, basketball gained ground both as a mean of recreation and as a mean of prophylaxis and even recovery of the diseases. In order to increase the efficiency of this approach, the population is faced with many changes, and the most important is education through building mentally a athletic attitude.

The field's experts thus have the task of continuously deepening their own field of activity and finding multiple solutions for the development of the targeted business segment. In this paper, we wanted to determine whether basketball-specific means can correct vicious attitudes of the spine, in this case, the kyphosis. To accomplish this study, we worked with 8 patients diagnosed with varying degrees of kyphosis in a 6-month period with a frequency of 3 appointments per week. The therapeutic plan was conceived and applied under the direct supervision of physiotherapy specialists, and the results obtained determine the effectiveness of the exercises that can be used successfully in achieving the proposed goal.

Key words: *physical therapy, adapted exercises, sports, kyphosis, basketball.*

Introduction

The relationship between health and movement is considered the solution to an active life in today's modern context. Society is prone to static activities that greatly increase the risks of inappropriate bodily attitudes. Current health research sets new directions for action to improve life. There is a growing correlation between the health condition and the notion of sport. Tittlbach et al. (2011, 283-291), states that the results of his study show that physical activity is associated with adolescent health in relation to the promotion of health resources. Marcu et al. (2007), states that physical inactivity is a major public health problem and a major risk factor in many chronic conditions.

There is a mutual relationship between the alignment of body segments, the body as a whole and the efficiency of the locomotor function (Sbenghe, 1987). For humans, it has become a rule today that a faulty body composition is also dysfunctional for one or other of the basic functions of the body.

From the point of view of the spine, one of the most common deficient attitudes among children is the kyphotic attitude where, at the thoracal and sacral level, the column goes beyond the gravitational line. Kyphosis is characterized by the whole back with the concave back, the shoulders being brought forward, the thorax is flattened or clogged, the abdomen is sucked or pricked. This deviation of the spine is frequently found in high and weak schoolboys (Stan, 2009), who seem embarrassed by their excessive height, and studies show that there is a link between the degree of kyphosis and the anxiety of the individual (Saiiari et al, 2011).

The spine presents a series of physiological curves, some in the sagittal plane (antero-posterior), others in the frontal plane (Vaida, 2005). Kyphosis is the deviation of the spine in the anteroposterior plane, with the convexity of the curved back. Sometimes we can see the exaggeration of normal curves. Docu-Axelerad (2009), states that the

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limits between normal and pathological are difficult to determine because of individual variations. The stiffness of the curves, possibly the appearance of pain and the existence of structural changes in the x-rays, can establish the pathology area. Exaggeration of the normal chest curvature translates into the appearance of a round back, with the shoulders lowered and brought forward.

Physical therapy has its own means of treatment and uses as the primary means of treatment and prevention of the basic or associated disease complications, the physical exercise, that is, the fundamental function of the living matter, which is the movement (Cordun, 1999). Because the purpose of physical therapy is to maintain or restore the health of the body (Balteanu, 2000), a wide range of means for the development of the healthy individual is used in the contemporary society.

Recovery of a deficiency, which has a well-defined medical-social and interdisciplinary content, is, according to OSM experts (cited by Pasztai, 2001), "the combined and coordinated use of social, educational and vocational measures for training or re-training people to obtain of a maximum possible functional capacity". Posture is the basic technique in the recovery of spinal deviations (Hodorca, 2017). From the point of view of the body, Albu (2007) states that posture is influenced by three factors: heredity, pathological states and habit. In the same context, Lazar (2017) finds favor factors for the figure and the position in the school bench or work table, the insufficiency of back and scapular muscles, or the adoption of relaxing, flexing, deficient positions.

To correct vertebral deviations, free and strong dynamic exercises are used, and sports games are highly recommended for recovery, such as basketball or volleyball (Docu-Axelerad, 2009).

Starting from the objectives of physical therapy to restore normal body alignment, regaining the amplitude of movement, muscle strength and resistance, regaining coordination, control and balance, reeducation of sensitivity, correction of respiratory deficit, regaining of effort, plus the ability to form relaxation, we can state that by its formative-educational valences, through its specific movements and last but not least, the movement that use in basketball has many means to be an important associate with physical therapy (Ghițescu, 2002). Afyon and Ozkan (quoted by Kayapinar et al., 2012), states that young people who practice basketball (12-15 years old) have a near-standard posture.

From a research point of view, the interaction between sports games using the ball and different attitudes of the spine has been studied. Thus, after Leonte et al. (2017), physical exercise as well as the prophylaxis of spine attitudes contribute to fighting the effects of demographic aging in the long run. In this respect, educating the correct attitude of the body is based on the connection between the formation of the attitude reflex (self-control of the position of the body and its segments) and the development of the muscular groups.

Material and method

The purpose of the research is to analyze the results obtained in the treatment of kyphosis by means of basketball game. Subjects of the study were 12 male patients aged 13-20 years with different kyphotic attitudes. They participated, under the supervision of the physical therapist, to a 6-month recruitment program using basketball-specific means. The frequency of work sessions was 3 times per week, 50 minutes per session for all patients.

Prior to the onset of the therapeutic program, measurements were made for patients to assess the kyphotic attitude. The test was that of the cervical arrow, which is done by placing the patient back against a wall and measuring the distance from the cervical C7 vertebra to the wall. (Braniste et al., 2018)

Statistical data was processed using Origin 6.0. In order to determine whether the mean values of two sets of variables (in this case the deviation of the spine as measured by cm before and after the recovery program) are statistically different, the "t test".

In the case of dynamic movements (throws, displacements, flexions etc.), 12-15 repetitions were used for each exercise. In the static exercises, the subjects maintained certain positions for 30 seconds.

From the point of view of the applied means, we find (Figure 1):

a. *Throwing in the basket with one handover the head.* Fagaras (2015) reminds that in the case of basketball basketball's throwing movement, the kinematic chain used is a complex one consisting of - flexing the fingers, flexing the fist, elongating the elbow, arm anteducers, lifters and muscles that swing the scapula to the side. A correct biomechanical throw, manages to maintain a posture that positively influences kyphotic attitudes.

b. *Layups.* The moment of efficiency for retrieval of kyphosis consists of time in the air, from the time of the jump to landing on the ground. The patient maintains the extended column, the load being minimal, and the look always upward.

c. *High defensive position.* For recovery, the patient will maintain the flexion position at 180° of upper limbs, the column forming a right angle with the ground, the lower limbs in slight abduction, distal to the shoulders and the head upward in order to obtain additional contractions in trapezius muscle.

d. *Top up with 2 hands above your head.* Execution forces the subject to make an extension at the trunk level, making an extension of the dorsal column.

e. *Walk with the ball back.* The patient will hold the ball with both hands on the dorsocortical area with an extension of the arms concurrent with the flexion of the forearms on the arms up to the formation of the angle 50-60° at the elbow joint, the head slightly upward until occipital zone contact with the ball.

f. *From hanging,* the flexion of the thigh on the trunk with the basketball ball positioned in the patient's torso-haired area and the fixed ladder. The texture of the ball will dock the patient by touching the fixed ladder, permitting a correct execution.



Fig. 1. Basketball-specific means used to recover the cifotic attitude

(a) throwing in the basket, with one hand above the head; (b) Layups; (c) high defensive position; (d) over the top with 2 hands above the head; (e) walking with the ball at the back; (f) thigh flexion on the trunk from hanging

Results

The results obtained from the initial measurements but also from the results of the recovery program are presented in Table 1.

Table 1. Cervical arrow (cm)

	Initial Testing	Final Testing
1.	4.3	3.5
2.	4.8	3.7
3.	5.1	4.3
4.	3.5	3.1
5.	4.6	3.6
6.	4.4	3.2
7.	5.2	3.9
8.	5.4	4.5
9.	4.6	3.8
10.	4.7	4.0
11.	5.1	3.7
12.	4.8	3.6

The "p" value was calculated for a significance level $\alpha = 0.01$ and gave a value of $3.27E-9$ which is well below the predetermined level of significance (Table 2). Thus, the null hypothesis is rejected and the difference between the two mean values before and after the recovery program is statistically significant.

Table 2. Statistical processing of the deviations of the curvature of the vertebral column of the analyzed subjects, measured before and after the implementation of the recovery program.

	Cervical Arrow (cm)	
	Initial Testing	Final Testing
Mean Value	4.71	3.74
Standard deviation	0.50	0.40
Mean standard error	0.15	0.12

$p = 3.27E-9 < 0.01$ – The initial and final mean values are significantly different

After application of the therapeutic program, after a period of 6 months, we can observe the average values obtained by the subjects of the research (Fig. 2). In this respect, if the average patient initial value was 4.71 cm, using basketball-specific means, the mean deviation of the column was 3.74 cm. The decrease, averaging 0.97 cm, shows that basketball exercises and methods can be successfully used to treat cifosis in a relatively short time

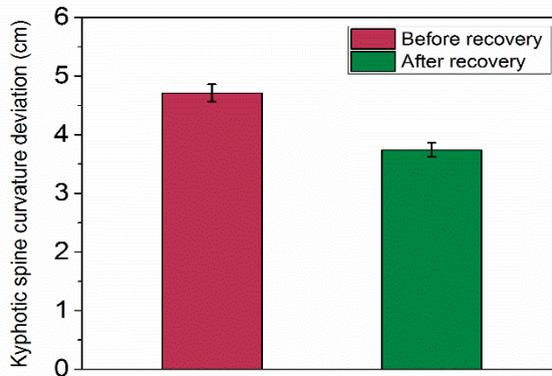


Fig.2. The graphical representation of the mean values of the deviation of the curvature of the kyphotic column measured before (red) and after (green) implementation of the recovery program, respectively for the group of 12 subjects.

Conclusions

Using sports disciplines to treat postural disorders is no longer a novelty in medicine. Using optimal methods to deliver effective recovery programs, industry specialists are leading new challenges.

The results of the study may be starting points for physical therapists interested in modern approaches to the treatment and recovery of posture disorders. At the same time, the interaction between the specifics of a sports discipline and the methods of recovery of patients is highlighted by the results obtained by those interested in the issues addressed. Among them, Cătuna et al. (2017) states that working with the ball adds a dynamic and varied character, is more interesting to patients and maximizes therapeutic effects. The exercises used thus lead to the adoption of the correct positions easier, which can lead to a normal health posture.

Similar research was carried out by Grabara (2015). In his study, the fact is that in the case of sports games (volleyball), the training does not adversely affect the position of the subjects. The same conclusion was reached by Barczyk-Pawelec et al. (2012) among table tennis practitioners. Grabara (2012) has demonstrated that frequent participation in basketball training leads to the correction of the kyphotic degree of a patient.

Summing up, it can be said that kyphosis can be treated by using the specific means of basketball play. In this respect, especially among children, the process of recovery is transformed into a dynamic, diverse and complex activity that alleviates the state of discomfort created by the actual disorder.

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The Assessment of Motor Skills and Physical Development of a Number of Students from Moldova Area

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Abstract

Evaluating motor skills and physical development of students is an important step in selecting young people to practice certain sport disciplines. **Material and Method:** The study was carried out on a batch of 164 pupils in the 5th grade from high schools in Onesti (47 pupils), Câmpulung Moldovenesc (54 young people) and Panciu (63 cases). At these students, motor skills were assessed (starting from scoring scales for long jumping and pitching) and physical development (height and weight). **Results and discussions:** The jump corresponding to the highest score is present in 41.46% students, but the differences calculated by collectivities are statistically significant at a $p < 0.05$ ($f = 8$, $\chi^2 = 15.949$). The throw of the ball corresponding to the highest scale is present in 57.31% of students, the differences calculated by collectivities being statistically significant at a $p < 0.05$ ($f = 8$, $\chi^2 = 38.123$). The height of the students in the study group is mostly average (74.39%) as well as body weight (76.21%). In weight, differences in collectivities are statistically significant at a $p < 0.01$ ($f = 6$, $\chi^2 = 20.570$). Physical development is a harmonic dominant (69.51%), with statistically significant differences in a $p < 0.001$ ($f = 6$, $\chi^2 = 22.978$). **Conclusions:** There are major differences in motor skills and physical development of pupils in different urban communities. These particularities must be known by the coaches interested in the selection of young performers in some sporting disciplines.

Keywords: body weight, height, physical abilities, sports selection;

Introduction

The orientation of a young person towards the systematic practice of a certain sport activity is an essential action, based on a rigorous selection by the specialists in the field. If the selection is not rigorously made, it can not reach the level demanded by the great sports performance. Selection is a complex activity that is done horizontally and vertically. The horizontal selection is specific to the beginners, while the vertical selection involves the athlete being promoted to the upper echelon (Stoian, 2017).

The selection and orientation of the students towards a particular sporting branch must be based on the appreciation of the physical abilities, the physical development of the child and his / her environment of origin. The appreciation of the physical abilities of young people is based on the specifics of the sport activity to which young people will be oriented. In handball, for example, it is necessary to select fast, skillful and well-developed young people. It is also necessary to have a balanced psychomotor evolution that involves a well-defined body pattern, adequate spatial orientation and homogeneous laterality, meriting even ambidexterity (Abalasei and Popescu, 2016; Albu and Albu, 1999).

Physical development is another essential element for guiding the young person towards a particular sport branch. The selector should take into account the general characteristics of the growth and development processes. Height increase is genetically determined, there is a correlation between the heights of the parents and the children (Albu, Indrei and Cărașușu, 2017). Also, growth is uneven for the same amount of time. The child grows in length then in thickness, followed by another growth of length and then a growth in thickness.

The third aspect that needs to be known is the one related to different development depending on the family background. There are developmental differences between urban and rural children, which requires an appropriate selection from this element as well. These differences occur in young people worldwide (except those in the US and Australia), which are generated by a complex of factors that are more balanced in the city (not dependent on agricultural production), better access to health care in urban, better education for the urban population. Differences

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are high and require differentiated benchmarks (national standards). Not only the urban / rural environment differentiates the evolution of the child but also the geographical one, with differences of development between the various geographic regions of the country (Stănescu, Stoicescu and Bejan, 2018).

Objectives of the study: to know the motor skills of students in the study group; Differential appreciation of the results obtained in long jump test and throwing the ball according to collectivity and gender; identifying the geographical regions in Moldova where the results obtained in the assessment of motor skills are good and even very good; evaluating the physical development of students in the study group by fitting the values of height and body weight in sigma classes; establishing the physical development diagnosis of the pupils in the study group and assessing the differences that occur according to gender and collectivity.

Material and method:

A batch of 164 fifth-grade students aged between 10 and 12 years was examined. There are 47 pupils (28.66%) from the Ghita Mocanu School from Onesti, 54 pupils (32.92%) from the Teodor Stefanelli Teodor Stefanelli School in Campulung Moldovenesc and 63 children (38.41%) from the "Al.I.Cuza" Technological High School in Panciu. The distribution of pupils on sex indicates the presence of 79 boys (48.14%) and 85 girls (51.82%). At the school in Onesti, 26 boys (55.31%) and 21 girls (44.68%) were examined, at the school in Campulung Moldovenesc the study group consists of 28 boys (51.85%) and 26 girls (48.14%), and Panciu city 25 guys (39.68%) and 38 girls (60.31%). Students are all urban learners that allow us to compare the results of collectives. At these students were appreciated motor skills and physical development.

Motor abilities were evaluated from the 5th grade grading scale for long-distance jumping and throw-offs (Table D).

Table I - National Scoring Class Scale

	Under 5	5	6-7	8-9	10
			Long jump (cm)		
Boys	Under 150	150	153-156	159-162	165
Girls	Under 130	130	133-136	139-142	145
			Throw off (m)		
Boys	Under 18	18	19-20	21-22	23
Girls	Under 12	12	13-14	15-16	17

It is a valid scale for all schools in Romania, the results obtained being important for the coaches interested in the selection of students for training in certain sports fields.

The physical development indicators used are height and body weight. The results obtained were reported to the reference values known as national standards. These are national values by measuring a statistically significant number of children of a certain age, gender and family background. It calculates the specific average values and the standard deviation, which allows the realization of the sigma intervals. The level that falls within the average +/- average is considered to be average, the average + sigma + 2 sigma, high, and the median + 2 sigma + medium + 3 sigma. At the opposite end, small values (between media - sigma and medium - 2 sigma) and very small (between mean - 2 sigma and medium - 3 sigma) are placed. Lower mean values - 3 sigma and the highest mean + 3 sigma are pathological. To avoid dispersal of results, we will associate the small and very small level with the very large one. The results were processed using the Pearson CHI square test.

Results:

The study is geared to two main directions represented by assessing students' motor skills and appreciating their physical development.

Motor skills were appreciated with the help of two sports scores for which there are scoring scales. It's a long jump on the spot and a throw-in ball.

The jump in the length is executed under the 5th vote by 23.78% young people, a worrying result for the students in the study group. Practically, one quarter of young people surveyed have insufficient motor skills. At the opposite end, 41.46% of students are performing at the maximum level (Table II).

Table II - The score obtained by the students at the jump long test

Vote	Under 5	5	6-7	8-9	10
	Distribution by community				
Onesti School	17	3	5	5	17
Campulung Moldovenesc School	6	2	10	10	26
Panciu Highschool	16	6	3	13	25
	Distribution by genre				
Boys	25	8	10	11	25
Girls	14	3	8	17	43
Total	39	11	18	28	68
%	23.78	6.70	10.97	17.07	41.46

Differences calculated on schools are statistically significant at a $p < 0.05$ ($f = 8$, $\chi^2 = 15.949$) and attract attention to the students from Onesti School and Panciu High School where the frequency of the results placed under vote 5 is quite high. The results obtained by sex are statistically significant at a $p < 0.05$ ($f = 4$, $\chi^2 = 11.449$) and draw attention to the boys whose votes below 5 are numerous.

Throwing a ball is another test at which there is a score scale that allows the results to be mapped. It is noted the presence of 12.19% youngsters performing the sample below vote 5 but also 57.31% performing at the level of vote 10 (Table III).

Table III - The results obtained by the pupils at the throw of the ball.

Vote	Under 5	5	6-7	8-9	10
	Distribution by community				
Onesti School	13	8	6	6	14
Campulung Moldovenesc School	-	1	4	4	45
Panciu Highschool	7	4	7	10	35
	Distribution by genre				
Boys	13	6	9	7	44
Girls	7	7	8	13	50
Total	20	13	17	20	94
%	12.19	7.92	10.36	12.19	57.31

The results obtained distributed by classes focus especially on the pupils at the school in Campulung Moldovenesc, where there are no children to perform below grade 5. The differences calculated by collectivities are statistically significant at a $p < 0.001$ ($f = 8$, $\chi^2 = 38.123$), and those calculated by sex are statistically insignificant ($p > 0.05$, $f = 4$, $\chi^2 = 3.917$).

The second aspect of the study is the physical development of the examined students. The indicators used are height and weight that will allow us to appreciate the diagnosis of physical development.

The height is mostly in average values (74.39%), which leads us towards a good evolution of this indicator. We note the presence of 10.97% of students with very low / low values of height and of 14.63% young people with high / very high values. It is a good result indicating a near Gaussian evolution of the values of the height (Table IV).

Table IV - The height of students distributed by sigma classes.

The sigma class	Very low / low	Average	High / Very high	Total
	Distribution by community			
Onesti School	3	35	9	47
Campulung Moldovenesc School	4	40	10	54
Panciu Highschool	11	47	5	63
	Distribution by genre			
Boys	11	60	8	79
Girls	7	62	16	85
Total	18	122	24	164
%	10.97	74.39	14.63	

On collectivities, the differences obtained are statistically insignificant ($p > 0.05$, $f = 4$, $\chi^2 = 7.092$) a similar result is obtained with regard to the distribution of results according to the sex of the students examined ($p > 0.05$, $f = 2$, $\chi^2 = 3.384$).

The weight is averaged in 76.21% of cases. We note the presence of 5.48% young people with very low / low body weight and 16.46% adolescents with high / very high weight. It is important to pay special attention to pupils with pathological weight values (1.82%), because they have to be taken into account by specialists in the field (Table V).

Table V - Weighting of body weight in sigma classes

The sigma class	Very low /low	Average	High / Very high	Pathological	Total
Distribution by community					
Onesti School	7	34	6	-	47
Campulung Moldovenesc School	1	37	13	3	54
Panciu Highschool	1	54	8	-	63
Distribution by genre					
Boys	4	64	9	2	79
Girls	5	61	18	1	85
Total	9	125	27	3	164
%	5.48	76.21	16.46	1.82	

Differences calculated by collectivities are statistically significant at a $p < 0.01$ ($f = 6, \chi^2 = 20,570$) result that is particularly directed towards pupils from Campulung Moldovenesc School where there is an increase in the number of young people with very large weight and pathological weight. On sex, the calculated differences are statistically insignificant ($p > 0.05, f = 3, \chi^2 = 3.421$).

Diagnosis of physical development allows for an appreciation of the correlation between height and weight. We note the presence of 69.51% of the young developed harmonious, a positive result especially for 5th grade students whose growth is intense (Table VI).

Table VI - Diagnosis of physical development in the study group

Diagnosis	Harmonious	Disharmonious - weight	Disharmonious +weight	Pathologic	Total
Distribution by community					
Onesti School	31	11	5	-	47
Campulung Moldovenesc School	40	2	9	3	54
Panciu Highschool	43	3	17	-	63
Distribution by genre					
Boys	60	4	13	2	79
Girls	54	12	18	1	85
Total	114	16	31	3	164
%	69.51	9.75	18.90	1.82	

There are 9.75% of disharmonic pupils with a minus weight and 18.90% of young people with disharmonious + weight. It's not a worrying result because we're talking about growing students. In the Onesti school are dominant situations of disharmonious development with a minus weight while in the Panciu, disharmonious development with a plus weigh. Differences calculated by collectivities are statistically significant at a $p < 0.001$ ($f = 6, \chi^2 = 22,978$) and draw attention to the different development of students in the study group. By gender, the calculated differences are statistically insignificant ($p > 0.05, f = 3, \chi^2 = 7.974$).

Discussion:

The motor skills of the students in the study group were appreciated comparing the national scoring scales. At the long jump, we notice the presence of 23.78% youngsters running under the lowest vote, and 12.19% youngsters with a lower execution than the passing rules. The result is different depending on the demands imposed by the required physical exercise. In another study conducted in the area of Moldova in the urban environment, only 6% of students perform the push-up test (another type of physical exercise) below vote 5 (Onose, Hodorca and Albu, 2018). Practically, selecting for a certain type of physical activity will require the development of a complex of samples specific to each sport.

The result obtained by the collectives is different and draws attention to the pupils from the Campulung Moldovenesc school who have a lower percentage of the result situations under score 5 in the long jump on the spot and do not have such a result in the ball throwing test. The Campulung Moldovenesc area is a mountain with an elevated altitude that can be associated with major changes in the physical exercise capacity of young people (Iordache, 2009).

In high mountain areas there is a decrease in partial oxygen pressure associated with compensatory changes from the body (acclimatization reactions), represented by increased red blood cell count and hemoglobine count, pulmonary ventilation, pulmonary vital capacity (Prejbeanu, 2014).

Another important aspect is that of gender differences. At the jump long test, the percentage of girls with executions under Note 5 is lower than that of the boys. It is an easy outcome to understand the evolution of puberty that is different in sex (Albu, Indrei and Cărașu, 2017; Misaki, 2013).

Physical development is appreciated from the values of height and body weight. The height of the pupils in the study group is placed at average values, in most cases, a result obtained even in another study conducted by students from the urban area of Moldova (Onose, Hodorca and Albu, 2018). The differences obtained in this study by collectivities and by sex are insignificant statistically. In a comparative study conducted on the teenagers in Bucharest and the Bran -Rucar corridor, the results obtained by the collectivity are different. Adolescents in Bucharest aged 11 years have average values of 144.56 cm in male and 146.64 in females. Those in the Bran-Rucar corridor have average values of 139.44 cm for the male and 140.63 cm for the female (Luca, Badrajan, Savu, Vulpe, Ciuhuta, Petrescu and Leasevici, 2015). In both collectives the mean values of the height are higher for female than for male, because girls at 11 years of age began the evolution of puberty while in boys, did not.

Body weight falls especially at average values, drawing attention to the young people in Campulung Moldovenesc, where there is an increase in the number of high / very high weight and pathological values.

It is necessary to know these cases, but also the correct interpretation of the results because the adolescent growth is uneven the growth periods in length alternating with the growth ones in thickness. Diagnosis of obesity should be done with great care and appropriate medical intervention is needed (The Society for Adolescent Health and Medicine, 2016).

The Physical Development Diagnosis will provide us with appropriate information about the physical development of the examined students. We note the existence of 9.75% young people with disharmonious with - weight weight and 18.90% with + weight. In a study conducted in Russia, 64.7% of young women with somatic development (balanced), 9.9% with asthenia (low weight) and 25.4% hypersensitivity (high weight) (Kolokoltsev, Iermakov and Prusik, 2018). Girls with a stenotic or asthenic somatotype are advantaged over the hypertensive ones in terms of motor skills: strength and superior strength of the muscles upper body extremities, faster speed and strength of the flexor muscles, a better force in the lower extremity of the body, a better general resistance.

Conclusions:

The motor skills of the students examined vary from one collectivity to another. There are obvious differences in sex, which is normal considering the faster triggering of female puberty. The height is mostly in average values like body weight. Interpretation of the results obtained at the diagnosis of physical development must be done correctly, because the growth is uneven the growth periods in length alternating with the growth ones in thickness.

The limits of the study are related to the impossibility of obtaining similar results from other geographical areas of the country (Transylvania, Muntenia).

Such studies are very important for the specialists who are in charge of selecting young people to be trained in various sports disciplines. The selection has to be based on a wide range of criteria represented by motor skills, physical development and even the geographical area where the students come from.

To make a right selection requires the involvement of a broad team of sports and sports medicine specialists.

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Lower Body Power Evolution on Romanian Professional Rugby Players – Forwards

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Abstract

The organizational changes in the first Romanian rugby league induced an overall evolution of the rugby game in recent years. These changes brought with them the need for updating the tactical, technical and strength and conditioning training. Knowledge of the physical training level and adapting it to the game requirements, does surely determine a performance improvement.

The purpose of this study is to highlight the evolution of the explosive strength in the last 4 years of the forwards compartment and the level of adaptation to the game requirements.

The hypothesis in this study is that the explosive strength of the lower limbs in rugby forwards developed during the past 4 years, trying to keep up with the higher needs in the first Romanian league.

Material and methods: The study was conducted in pre-season of the 2012-2013 season and again in the pre-season of 2016-2017 season. All players were part of the "CS Politehnica Iasi" rugby team, activating in the first Romanian rugby league.

Explosive power was measured using the "Just Jump System". A plyometric test mat on which the players conducted a set of 3 tests: Squat jump, Counter movement jump, Free jump

The forwards improved significantly their explosive strength in a four year period. Although the total body mass got bigger, the players managed to improve their lower limbs explosive strength, this fact proving a good physical adaptation to the requirements of the rugby game.

Keywords: free jump, squat jump, counter movement jump

Introduction

In the recent period, rugby has evolved considerably worldwide and nationwide. The restructuring of the first Romanian rugby league and the flow of foreign players have generated a rapid increase in the training level of professional players. In order to maintain a high level of the rugby game, the players of the first Romanian league have to meet the technical, tactical and functional somatic requirements. By the nature of its complexity, rugby requires a high level of strength combined with a good speed so the player can break the opposite defensive line or generate a good intervention as a defender. Therefore, the professional players have to adapt their training to these demands.

In scientific literature, there are several studies (Brannigan, 2016; Dragan, 2002; Duthie, Pyne, Hopkins, 2006; Gabbet, 2005) regarding the physical training level and the somatic profile of rugby players, mostly in the countries with tradition in this sport. Studies regarding the morphological and functional adaptation were conducted on children as well. (Ungurean & Popescu, 2017) In Romania, this topic has been approached increasingly in the recent years, considering the increased level of the first rugby league players.

The topic of this study concerns the evolution of explosive strength in a four year interval. The study was conducted on the same team, and mostly on the same players. This study regards only the rugby forwards. The forwards category comprises 8 players:

- front row: two props and a hooker;
- second row: two locks;
- back row : two flankers and a number- 8.

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We have chosen to study the compartments separately because they have different tasks and loads and this generate highly distinct physical capacities. This phenomenon also emerges for positions within the same category, but on a different scale.

The purpose of this study was to highlight the evolution of explosive strength in lower body during the last 4 years. This study is meant to complete previous studies conducted by the authors (Gabbett 2005). To conduct a good and specialised training program one have to realize the level of adaptation imposed by the opposite teams.

In this study, we have started from the following premises:

- The explosive strength of the lower limbs in rugby forwards developed during the past 4 years, trying to keep up with the higher needs in the first Romanian league.
- The explosive strength of the third line players is better than the other forwards due to the lower body mass.

Material and methods

The study was conducted during the 2012-2013 pre-season periods and again during the 2016-2017 pre-season periods. The athletes within our research activate in the “C.S. Politehnica Iași” rugby team, in the first rugby league. Both times the test was conducted on 10 forward players. (Table 1) We mention that only 3 players were part of the team for the both sets of tests.

Explosive power was measured using the “Just Jump System”. (www.topendsports.com) A plyometric test mat on which the players conducted a set of 3 tests:

- Squat jump: the player starts the jump after a held squat position for 2 seconds and both hands are held on waist all this time. Height of it is measured in cm.
- Counter movement jump: the player starts form a standing position; he makes a triple flexion and executes a jump in a continuous movement with both hands held on the waist.
- Free jump: is executed in a continuous movement helped also by the movement of the arms.

Results and discussion

The results were included in tables where we calculated arithmetic mean, standard deviation and T test, all calculatated in Microsoft excel. *Table 1* features the results of explosive strength measurements for the 2012 players. The average age is 24, showing a low age for the forwards (Gabbett, 2002). The height results are under the limits generated by professional rugby players for all 3 rows, especially for the front row (Nicholas, 1997). The average total body mass of players is below the profile of forwards. This feature may be due to the young age of the tested players (Brannigan, 2016). Regarding the jumping tests, we can see a big difference between the second row and the other forwards. The third row obtained almost the same results as the front row, although the total body mass is bigger for the front row.

Table 1. 2012 forwards results.

Position	Age	Body Mass	Height	Squat Jump	Counter Movement Jump	Free Jump
Front Row	24	101	176	27	28	33
Second Row	25	99	192	39	40	36
Third Row	24	95	183	27	28	35
Average	24	98	184	31	32	35
S. D.	0.5	2.5	6.5	5.7	5.7	1.2

Table 2 features the results of explosive strength measurements for the 2016 players. The average age is 27, showing a more appropriate age for the forwards than the 2012 players (Gabbett, 2002). The height results are within the limits generated by professional rugby players for all 3 rows. (Nicholas, 1997) The average total body mass of players fits the profile of forwards. This feature may be due to the more appropriate age of the tested players (Brannigan, 2016). Regarding the jumping tests, the results vary different than the 2012 players. The training programme for the 2016 season included a series of exercises aimed to improve balance and flexibility. As showed in other studies, this may improve lower limb power as well. (Cojocariu 2017) The best results are for the third row, opposite to the second row that obtained the poorest average.

Table 2. 2016 forwards results.

Position	Age	Body mass	Height	Squat jump	Counter movement jump	Free jump
Front row	26	114	182	43	44	46
Second row	29	119	193	39	41	44
Third row	26	104	187	43	43	49
Average	27	112	187	42	43	46
S. D.	1.4	6.2	4.5	1.9	1.2	2.1

In Figure 1 we have the comparison between the 2 front rows. We can observe significant differences in age, height and body mass. The 2016 show more appropriate results for a rugby first league team. Having in mind that the principal capacity of the forwards is force, in its different forms, the average age for rugby forwards is over 25 years (Gabbett, 2002). Also the height is better for the 2016 players. The body mass is a key element for forwards, especially in the scrums and that is why the 2016 players show a better adaptation to the game needs.

The results of the explosive strength test are significant ($P>0.05$) better for the 2016 players in all 3 tests. In all 3 tests differences are higher than 10 cm. Also the players who were tested both times show a very good evolution over the 4 year period. The results of the 2016 players are situated within the limits for international professional players. (Oprean, 2014)

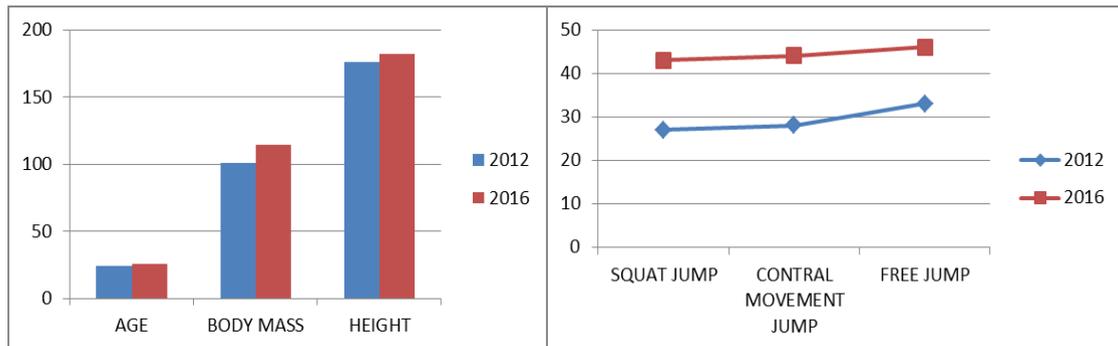


Figure 1. Front row results.

In Figure 2 we have the comparison between the 2 second rows. We can observe significant differences in age and body mass. The 2016 show more appropriate results for a rugby first league second row, because the locks, thru the nature of their attributions are the players with the bigger height and body mass in a rugby team (Gabbett, 2002). Although the height is almost the same, the body mass difference is of 20 kilos. The body mass is a key element for forwards, especially in the scrums and that is why the 2016 players show a better adaptation to the game needs. (Pock, 2012)

The results of the explosive strength test are the most alike for the second row. The average results for squat jump and contral movement jump are almost the same. The only notable difference ($P>0.05$) is for the free jump, where we can see a better result for the 2016 second row. The results of the 2016 players are situated within the limits for international professional players. (Oprean 2014)

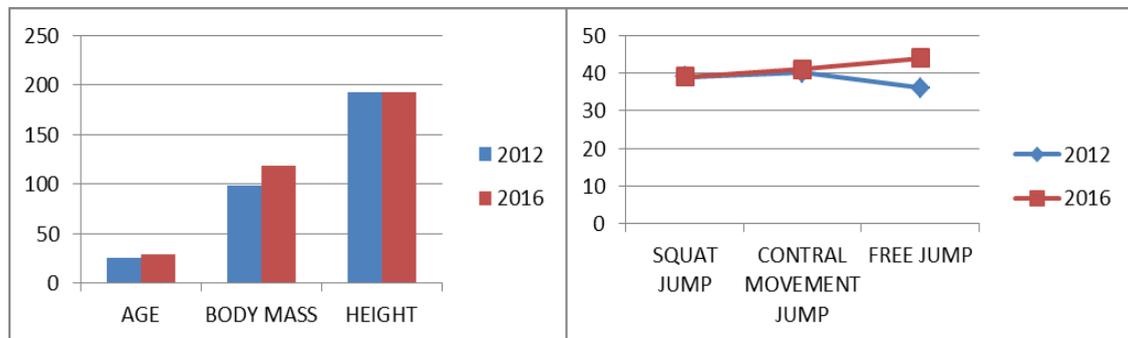


Figure 2. Second row results.

In *Figure 3* we have the comparison between the 2 third rows. We can observe significant differences in age, height and body mass. The 2016 players show more appropriate results for a rugby first league third row (Gabbett 2002). The weight and height of the third row developed in the last four years, proving a good adaptation to the modern rugby requirements.

The results of the explosive strength test are significant ($P>0.05$) better for the 2016 players in all 3 tests. In all 3 tests differences are higher than 10 cm. Also the players who were tested both times show a very good evolution over the 4 year period. The results of the 2016 players are situated within the limits for international professional players. (Oprean, 2014) The third liners show the best results in free jump test, for the other 2, they are on the same level with the front row players.



Figure 3. Third row results.

Significant power differences appeared between the Caucasian players and Polynesian ones. We registered higher values for the lower limb power in the case of the Polynesian tested players. Same results were obtained in similar studies. (Zemski et al., 2018) The number of Polynesian players is not relevant, therefore we cannot extract any conclusions on this topic, but we consider launching a study in this topic in the near future.

Conclusions

It can be concluded that the results vary significant in a four year period for the players of the same team.

- The forwards improved significantly their explosive strength in a four year period. Although the total body mass got bigger, the players managed to improve their lower limbs power, this fact proving a good physical adaptation to the requirements of the rugby game.
- Even if only two thirds of the initially players remained for the second test, the remaining players show a very good adaptation of explosive strength and morphological characteristics.
- The best results are obtained by the front and third row. The difference is only for free jump, which is better for third liners. Having in mind the weight difference between these two rows, we can conclude that the second hypothesis is only partially proved.

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The Influence of Motoric Activities on the Cognitive Sphere at Childrens from the Primary School

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Abstract

Introduction. Around the age of 6, an entirely new event takes place in the child's life, that of entering school. From now on, the whole physical and mental development will be influenced by this new environment. In each cycle of child development there is a characteristic of thinking. From the age of 6-7 years to 10-11 years, the child's thinking goes into the stage of concrete operations. At this stage, mathematical logic operations and infrared operations are developed. Cognitive development looks at how children acquire knowledge and understand the world around them, as well as different skills such as memory, reasoning, or learning.

Objectives of study are to demonstrate the influence of the motoric capacity on the cognitive sphere and to observe the efficiency of the physical activity that precedes other disciplines in the primary school curriculum.

Materials and methods. For the research, perspicacity tests were used for each age level and different application paths taken from the curriculum. The statistical processing was performed with the StatsDirect v.2.7.2 program. The graphical representation of the results was done with the Excel application (Microsoft Office 2010).

Results. From the desire to see whether the performance of the utility route influences or not the times obtained in the perspicacity tests, the values of the times obtained in the T1 and T2 traceability tests were compared for all lots. In the statistical analysis of the time obtained for T1 and T2 for non-paired samples, the decrease in T2 values was observed over T1, the difference being statistically significant in lot II ($p < 0.0001$). For lots I and III, differences were not statistically significant ($p > 0.05$).

Conclusion. Physical effort makes its presence felt as a result of performing motor skills, positively influencing the student's cognitive capacity by gender and age. We also wanted to highlight the importance of driving situations to foster the use of effective and transferable strategies to solve the problems encountered by students during classes.

Key words: motor activity, cognitive activity, primary school

Introduction

Around 6 years of age, a special event takes place in the child's life, that of entering the school. Once the child enters the school, learning becomes the fundamental type of activity (Crețu, 2009).

It is often said that childhood is the age of the game. This is the way the child manifests its independence. From birth the child knows and experiences everything that surrounds him. "The movement is a vital necessity for man, but especially for the growing child. Activities in physical education classes are educational, effective means that induce and stimulate the child's physical, mental and social development" (Chiriță, 1983).

Motricity is a broad concept that encompasses a set of physiological, anatomical, neurological, psychological functions that ensure the movement (Bouchard, 2009). "It is the function that allows the dissociated, associated or coordinated action of several parts of the body or of the entire chorus with or without visual control" (Frederique, 2014).

In each cycle of child development there is a characteristic of thinking. From the age of 6-7 years to 10-11 years, the child's thinking goes into the stage of concrete operations. At this stage, mathematical logic operations and infrared operations are developed (Tourrette & Guidetti, 2002).

"Cognitive development looks at how children acquire knowledge and understand the world that surrounds them, but also different skills such as memory, reasoning, or learning. Cognitive processes require great influence on the ability to express, communicate, move, solve interpersonal and intrapersonal conflicts." (Frederique, 2014).

At this age, children are better exposed to information by developing all the motor skills and intellectual development, making it easier for them to reproduce certain movements or stories through both visual and mental imagery (Donos, 2012).

The research objectives are:

- Demonstrate the influence of motor capacity on the cognitive sphere, by choosing the means specific to each age.
- Another objective is to observe the effectiveness of physical activity that precedes other disciplines that students have over a day.

Subjects

The study was carried out within the "Eugen Pora" Theoretical High School in Cluj - Napoca, the time allocated to it was 4 weeks. The number of subjects differed from class to class, so for the Preparatory Class we have - 12 pupils, 1st and 2nd grade - 14 pupils, 3rd and 4th grade - 15 pupils.

Methods and means

For the realization of the research, various perspicacity tests and utilitarian-applicative routes specific to the age, taken from the curriculum, were used. The study of the bibliography was applied as a method for documenting research. The statistical processing was performed with the StatsDirect v.2.7.2 program. The graphical representation of the results was done with the Excel application (from the Microsoft Office 2010 package).

Students were tested during physical education classes, and in the first stage they made a test of perspicacity (the timing of the time it was being solved), the second stage of utility-application route, and the last stage consisted of another perspicacity test in the shortest possible time (tests and utility-application routes have been changed every time). For the implementation of utility-application route there were used didactic means such as: gymnastic benches, circles, jaloos, gymnastics box, balls, stopwatch and whistle.

Statistical analysis

The Shapiro-Wilk test was used to test normal distribution. In the case of normal distribution data, the t (Student) test was used and in the case of non-uniform distribution values or ranks the non-parametric Mann-Whitney (U) non-paired test was used. For the analysis of three or more samples the ANOVA test was used for normal distribution data or Kruskal-Wallis nonparametric test for non-uniform values or ranges. The significance threshold for the tests used was $\alpha = 0.05$ (5%), 0.01 (1%) or 0.001.

The Pearson correlation coefficient (r) was used to detect the correlation between two continuous quantitative variables with normal (uniform) distribution. In the case of non-uniform distribution variables, Spearman (ρ) correlation coefficient was used. Analysis of correlation coefficients was performed using Colton's rule.

Results

Batches:

- Lot I – Preparatory Class;
- Lot II – 1st and 2nd grade;
- Lotul III – 3rd and 4th grade;

Studied indicators:

- T1 – Perspicacity Test 1;
- T2 – Perspicacity Test 2;
- T. U-A – Utility–Application Route.

Table 1. The results for the Preparatory Class

Name	Time Persp. T. 1	Time U-A Test	Time Persp. T. 2
B.I.	65"	39"	36"
B.A.	49"	26"	34"
C.V.	38"	40"	23"
F.J.	21"	40"	23"
G.G.	31"	37"	21"
O.F.	54"	32"	20"
M.E.	56"	40"	61"
M.O.	40"	44"	26"
M.I.	28"	41"	33"
U.A.	55"	39"	28"
V.B.	14"	48"	23"
V.A.	56"	37"	43"
Total	8'27"	7'43"	6'11"

Table 2. The results for 1st and 2nd grade

Name	Time Persp. T. 1	Time U-A Test	Time Persp. T. 2
R.D.	87"	30"	35"
C.A.	93"	30"	39"
R.D.	62"	30"	40"
R.A.	75"	35"	45"
N.G.	141"	36"	46"
B.A.	77"	38"	47"
A.L.	87"	40"	47"
S.D.	67"	40"	47"
I.A.	84"	40"	49"
C.D.	87"	44"	49"
M.V.	87"	45"	55"
C.M.	93"	45"	56"
M.R.	90"	50"	60"
F.L.	63"	60"	63"
Total	19'53"	9'23"	11'18"

Table 3. The results for 3rd and 4th grade

Name	Time Persp. T. 1	Time U-A Test	Time Persp. T. 2
F.M.	74''	46''	37''
D.V.	70''	39''	28''
C.A.	60''	54''	72''
P.A.	75''	38''	96''
J.A.	67''	31''	45''
G.M.	57''	32''	60''
G.A.	58''	30''	66''
P.D.	50''	26''	60''
T.S.	67''	37''	72''
L.T.	85''	29''	75''
M.D.	53''	30''	60''
O.M.	75''	24''	50''
P.M.	74''	22''	60''
P.F.	81''	26''	50''
P.T.	79''	36''	155''
Total	17'05''	8'20''	16'26''

The differences between the first test and the second test are not very high. We can say that these students focused on the first test and the route, the second test of perspicacity facing problems. We do not summarize the fact that the student did not know the requirements of the first test, but that the breath was alert, the state of agitation, fatigue, and even sweating in some students, and the restoration of time and concentration on the second test was heavy.

In the statistical analysis of the times 1 (T1), taking into account all batches, statistically significant differences between at least two of the lots ($p < 0.0001$) were observed.

In the statistical analysis of the times obtained in the perspicacity test 1 (T1) for non-paired samples, we observed:

- statistically significant differences between batches I-II, I-III ($p < 0.001$);
- very significant statistical differences between batches II-III ($p < 0.01$).

Table 4. Comparative analysis of the times obtains at T1 in the studied groups and the statistical significance

Lot	Media	ES	Mediana	DS	Min	Max	Semnificația statistică (p)		
I	42,25	4,6419	44,50	16,0801	14	65	I, II, III	I-II	< 0,0001
II	85,21	5,1389	87,00	19,2281	62	141	< 0,0001	I-III	< 0,0001
III	68,33	2,7493	70,00	10,6480	50	85		II-III	0,0021

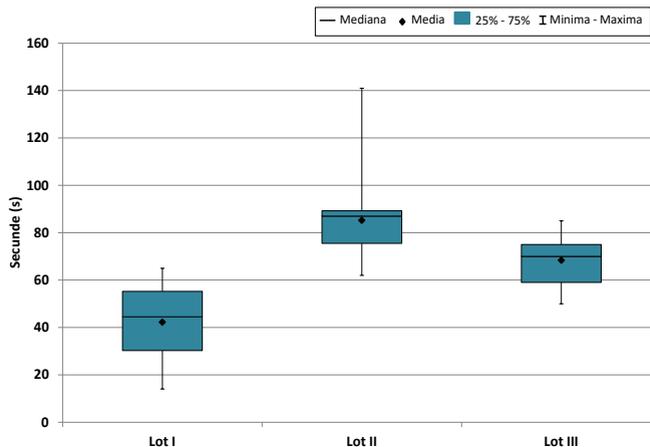


Fig. 1 The times obtained at T1 (s) at studied groups

In the statistical analysis of the times obtained by the utility-application route (T.U.-A) taking into account all batches, statistically significant differences between lots ($p > 0.05$) were not observed.

However, statistically significant differences between batches II – III ($p < 0.05$) were observed in the statistical analysis of the time for the non-putative sample, for non-paired samples, statistically significant differences were observed between batches II – III ($p < 0.05$).

Table 5. Comparative analysis of T.U.A (s) times in the studied lots and statistical significance

Lot	Media	ES	Mediana	DS	Min	Max	Semnificația statistică (p)		
I	38,58	1,5976	39,50	5,5343	26	48	I, II, III	I-II	0,5588
II	40,21	2,2365	40,00	8,3682	30	60		I-III	0,0667
III	33,33	2,2183	31,00	8,5912	22	54	0,0557	II-III	0,038

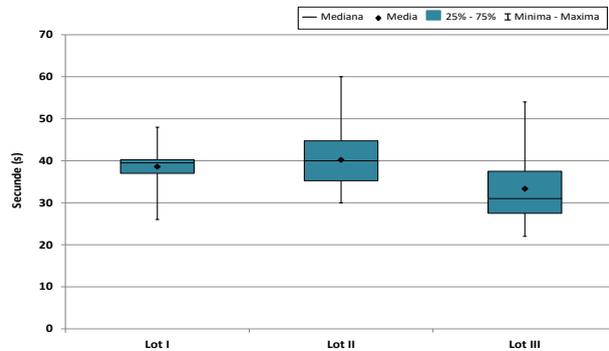


Fig. 2 The times obtained at T.U.-A (s) at studied lots

In statistical analysis of perspicacity test 2 (T2), taking into account all batches, statistically significant differences between at least two of the batches ($p < 0.00001$) were observed.

In the statistical analysis of the times obtained in the perspicacity test 2 (T2) for non-paired samples, we observed:

- statistically significant differences between batches I-II, I-III ($p < 0.001$);
- statistically significant differences between batches II-III ($p < 0.05$).

Table 6. Comparative analysis of the times obtained at T2 (s) in the studied lots and the statistical significance

Lot	Media	ES	Mediana	DS	Min	Max	Semnificația statistică (p)		
I	30,92	3,4033	27,00	11,7895	20	61	I, II, III	I-II	0,0002
II	48,43	2,1115	47,00	7,9005	35	63		< 0,0001	I-III
III	65,73	7,6703	60,00	29,7068	28	155		II-III	0,018

From the desire to see whether the performance of the utility route influences or not the times obtained in the perspicacity tests, the values of the times obtained in the T1 and T2 traceability tests were compared for all lots.

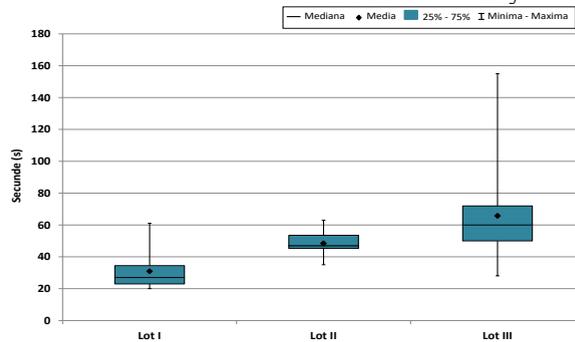


Fig. 3 The times obtained at T2 (s) for studied groups

In the statistical analysis of the time obtained for T1 and T2 for non-paired samples, the decrease in T2 values was observed over T1, the difference being statistically significant in lot II ($p < 0.0001$). For lots I and III, differences were not statistically significant ($p > 0.05$).

Table 7. Comparative analysis of the times obtained at T1 and T2 (s) in the studied groups and the statistical significance

Lot	Test 1			Test 2			Semnificația statistică (p) T1 vs T2
	Media	±	DS	Media	±	DS	
I	42,25	±	16,08	30,92	±	11,79	0,0855
II	85,21	±	19,23	48,43	±	7,90	< 0,0001
III	68,33	±	10,65	65,73	±	29,71	0,1965

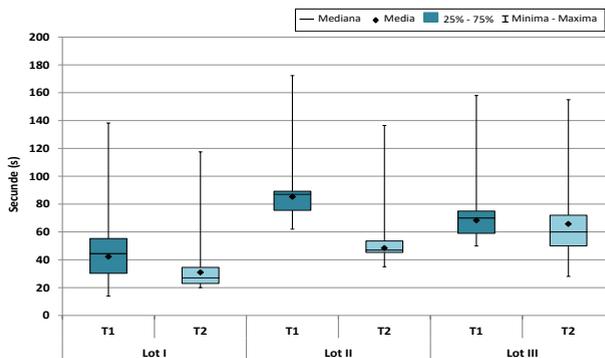


Fig. 4 The times obtained at T1 and T2 (s) at studied groups

Table 8. Statistical analysis of the correlation between the values of the studied indicators

Indicatori		Lot I		Lot II		Lot III	
T1 -	T.U-A	-0,4911	**	0,0449	*	-0,0700	*
	T2	0,6243	***	0,0123	*	0,1475	*
T.U-A -	T2	-0,0214	*	0,9572	****	0,0967	*

The statistical analysis of the correlation between the values of the studied indicators showed:

- lot I:
 - a good correlation between T1 and T2;
 - an acceptable but opposite relationship between T1 and T.U-A;
- lot II – a very good correlation between T2 and T.U-A;
- lot III – a weak/null correlation for all indicators.

Conclusions

In conclusion, physical effort makes its presence felt as a result of performing motor skills, positively influencing the student's cognitive capacity by gender and age.

Through the results of the research of each group of primary school classes, it was demonstrated that the motor activity positively influences the intellectual ability of the pupils, moreover, it trained for the activities that followed the day.

We also wanted to highlight the importance of driving situations to foster the use of effective and transferable strategies to solve the problems encountered by students during classes.

Teachers should be mindful of the conscious use of motor skills and teaching materials according to the level of development and particularities of each learner.

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ICU 2018

The Level of Motricity in Female Soccer Players (13-15 Years Old)

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Abstract

Purpose. The aim of this study is to develop general motricity in female soccer players by using motion games.

Methods. To evaluate the effects of relay races and motion games twenty female soccer players, divided into a control or an experimental group, were tested for 30 m sprint and lower limb strength.

Results. The use of motion games in the training of female soccer players resulted in significant improvements general motricity in experimental group ($p < 0.05$).

Keywords: general motricity; female soccer players; young soccer players;

Introduction

Since its appearance until today, the soccer game has made considerable progress, without any limitations on this. The fact that women's soccer has earned a safe place between performance sports proves that the rate of girls' soccer has increased considerably in recent years, as well as numerous international competitions (European championships, world championships, Olympic games) organized for different age categories - players under 15, under 17, under 19, senior. The soccer game is intermittent in nature and involves multiple motor skills, such as running, dribbling, kicking and jumping. And for that, monitoring soccer players is important for evaluating individual and collective team behavior during training sessions and games.

However, obtaining higher performances in soccer is conditioned by the early detection of girls with real qualities for practicing soccer (Cojocaru, V., 2002, Comăniță, P., 2004). That is why, in the case of soccer female players, it is necessary to implement the idea that without proper orientation, selection and training there can be no quality women's soccer (Mușat, G., Simion, G., 2007).

Because the child is not a 'little adult', he should be treated differently in the sport training process. Each stage of child growth and development, with specific rules of age specificity, must be well known by the coach (Damian, R., Ionescu-Bondoc, D., 2015). Therefore, optimizing sports training for children and juniors requires knowledge of their particular growth and development. Only on the basis of these particularities can a sports training process be developed that is appropriate to the age, level of development and the needs of the girls.

Muscle strength and speed are important physiological features for soccer players, features that help them perform the specific moves of soccer game: sprint, jumping, picking and swinging the ball (Reilly, Bangsbo, and Franks 2000). It is known that the strength of the lower limb muscles is associated with an increased level of performance in the jump and sprint tests (Gissis, I., Papadopoulos, C., 2006). For that, jump testing is commonly used to observe leg power. The goal of force development is to serve to specific needs, to develop its specific strength or its combinations, in order to increase the performance of athletes at the highest possible level (Cazan, F., Rizescu, C., Georgescu, A., Gidu, D., Negrea, V., 2013).

Physical and physiological capabilities of female soccer players must reach a certain level to be successful players (Haugen, T., Seiler, S., 2015). Milanović, Z. et al, (2017) consider that "*Muscular strength, as well as anaerobic power, can be important for female soccer players to increase running performance through force production*".

Considering the fact that the scientific research deals very little with the problems of preparing the female debutants in the soccer, it is necessary to find some means and methods of training that will lead to the achievement of sports performance in this branch of sports.

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Method

In order to assess the development of motricity level, 20 female soccer players from the sports club ‘Selena’ Constanta, divided in a control group (N = 10) and an experimental group (N = 10) were subjected to a training program for 4 months.

The age of girls ranged from 13 to 15 years – the control group with an average age of $M \pm SD$: age 14.0 ± 0.0 years; and their seniority in training of 1.8 ± 0.31 years. And the experimental group – with an average age of 14.2 ± 0.4 years and a seniority in training of 1.7 ± 0.75 years.

In the experimental group, motion games and relay races prevailed in the training program.

To highlight the motricity level, we applied 3 tests, namely:

- 30 m sprint - This test is designed to measure pure linear speed and explosiveness. Running is a fundamental building block for any athlete. The 30-meter sprint is more revealing than longer sprints of the short-track speed and acceleration common to most sports.
- vertical jump - The purpose of this test is to measure the explosive force (power) in the lower limb. This is the amount of power (strength & speed) an athlete can generate. The vertical jumping ability has a direct correlation to ability to accelerate and burn, in practice and at game-time.
- horizontal jump (penta-jump) - The purpose of this test is to measure coordination and explosive power through a series of 5 consecutive jumps on a single leg. On the other hands, The Penta Jump measures lower body power and stability. This tool is useful to observe how an athlete absorbs and uses energy. Athletes with more control and stability (knee, ankle) will perform better.

The experiment was conducted between March and June 2018, during about 4 months in the sporting base of the SNC Club. The number of training sessions was four (4) in a week, and was held in the morning between 9:00 and 11:00. The program for the experimental group included application paths and special motion games chosen and designed to contribute to the development of the motricity of the footballers, while these were not found in the witness control program as well. This, in order to determine their effect on the general motricity of soccer female players. In the fundamental part of the training (15-20 min), the subjects of the experimental group performed the exercises selected in advance. Exercises used in the experimental group were performed 4-6 times each training session.

The initial and final tests were conducted on the SNC football field in March - the initial one and in June - the final one. In both testings, tests were used to determine the level of development of the general motricity of the athletes in the experimental group.

Descriptive statistics (means and standard deviations) were counted for all the variables of the study. In statistical analysis of data, we considered the minimum significance threshold for $p = 0.05$.

Results and discussion

There were no significant differences between the two groups - the experimental and control groups during the initial testing. But in the final testing, the experimental group achieved significantly better results on all three tests (Table 1 to 3).

The data are presented in the tables below.

Table no. 1 – Results of 30 m sprint test (initial and final testing)

Subjects	30 m sprint (sec)	
	Initial Testing	Final Testing
Experimental N = 10	5.50 ± 0.31	5.45 ± 0.23
Control N = 10	5.50 ± 0.36	5.50 ± 0.31

At the ‘30 m sprint’ parameter, the experimental group recorded significantly better results at the final testing, compared to the control group $t = 3.036$, $p < 0.01$. And Ene-Voiculescu V., Ene-Voiculescu C. (2006) and Vaeyens, R., Malina, R.M. et all (2006) showed that at this age, speed can be slightly improved, even though literature suggests that speed is the most difficult motor skill to develop. Milanovic Z, Sporis G, Trajkovic N., (2012) consider that “*sprint performance in female soccer players can be improved using different methods of training such as resistance, speed and strength, velocity-specific strength and movement specific sprint associated exercises*”.

Also Huijgen B.C.H., Elferink-Gemser M.T., Lemmink K.A.P.M. and Visscher C. (2012), find that the players significantly increased their sprint performance after a twelve week training period.

Table no. 2 – Results of vertical jump test (initial and final testing)

Subjects	Vertical jump (cm)	
	Initial Testing	Final Testing
Experimental N = 10	23.50 ± 3.92	28.40 ± 2.64
Control N = 10	22.89 ± 3.12	23.77 ± 3.44

Testing vertical jump can give very precise information about the strength of lower limb muscles.

As for the ‘vertical jump’ parameter, in the final testing, the experimental group recorded average values of 28.40 ± 2.64 cm, while the control group recorded 23.77 ± 3.44 cm. The statistical analysis showed significant differences in favor of the experimental group (t = 3.685, p< 0.01). Gissis, I., Papadopoulos, C. (2006) recorded, in terms of amateur soccer players (12-13 years) values that are quite equal to our girls’ values. Negrea, V., Muşat, G.C. (2015) find significant difference in vertical jumping test after a period of a 10 weeks training, with 2 workouts per week, in basketball boys aged between 16 and 19 years.

Castagna C, Castellini E., 2013, find that in vertical jump performance as expected resulted significantly higher in male than in female competitive level matched players. But their results in female vertical jump test are similar to our girls.

Table no. 3 – Results of penta-jump test (initial and final testing)

Subjects	Penta-jump (m)	
	Initial Testing	Final Testing
Experimental N = 10	5.70 ± 0.30	7.58 ± 0.54
Control N = 10	5.40 ± 0.22	5.73 ± 1.43

As for the values recorded at the ‘penta-jump’ parameter, in the final testing, the experimental group recorded average values of 7.58 ± 0.54 m, while the control group recorded 5.73 ± 1.43 cm. The statistical analysis showed significant differences in favour of the experimental group (t = 4.314, p< 0.01). Gidu D.V. (2016) found a significant increase in lower limb strength in female soccer players.

McCurdy et al., 2010, found a strong relationship between unilateral vertical jump performance and sprint performance. Our results are in correlation with another research – which have shown that penta-jump test can be efficient for evaluating lower limb explosiveness in soccer players (Hammami, M.A. et al, 2012).

And Chamari K. et al (2008) find that the results of the penta jump test may be regarded as an explosive strength diagnostic tool under field conditions in elite soccer players.

Conclusions

The objective of this study was to investigate whether the motion games and the relay races entered in the training program would lead to the development of the motricity of female soccer players aged 13-15.

According to the statistical analysis of the data collected from the two tests (initial and final), it appears that the training program applied to the girls in the experimental group - based on motion games and relay races - had the expected effect. The fact that in the final test, the experimental group obtained better values than the control group in all tests, shows that the training methods used in the training of the girls in the experimental group were well chosen, thus demonstrating their effectiveness.

So, the training programme can explain the better performances in female soccer players.

However, given that the requirements for passing the tests, imposed by the Romanian Football Federation for this age group (13-15 years), imply the accumulation of a minimum score of 8 points for each test, we can state that the level of the motricity of the female soccer players being tested is inappropriate. We recall that these scores are those set by the Romanian Football Federation for 13-15-year-old boys groups, so for the future, we are proposing to develop a system of test and control rules to be a reference for women’s soccer.

On the other hand, according to the results, coaches should individualize training depending on players’ physical characteristics while ensuring that all players are able to perform at the match intensity levels.

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Student – Teacher Relationship in Physical Education Lesson at UAIC Iași

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Abstract

The research took place during January 12 – April 21 2018. We applied the questionnaires in the Faculty of Physical Education and Sports, in the D building of „AL.I.CUZA” University in Iași. **The research purpose** is to emphasize the relationship between the students within „AL. I. CUZA” University in Iași, who chose the *Physical education and sports* discipline and FEFS-UAIC Iași, the faculty „offering” this discipline (professors and material basis). **The research hypotheses** are: 1) We assume that between the students who have chosen the *Physical education and sports* discipline and the professors (at FEFS-UAIC0 Iași) there is a *good* collaboration and communication relationship. 2) We believe that the protocol of the *Physical education and sports* class is *beneficent* for the activities within the class. 3) We believe there is a degree of positive correlation between the protocol of the physical education and sport class and the teacher-student relationship. **Methods and research instruments.** As research method we used the sociologic inquiry in the „field”. The sociologic inquiry may be defined as a research strongly oriented towards field facts (Miftode, 1995, p. 60). As research instrument, we used the questionnaire. **The research population and group.** The research population is represented by the 1400 students at 13 faculties within „AL. I. CUZA” University in Iași, in the two first study years that chose the *Physical education and sports* discipline. The research population is presented in table 1. The results obtained determined a Spearman Coefficient of $r = -0.466$ ($p = 0.01$; $sig = 0.000$), which means that there is a negative, directly proportional relation between the two variables. The more rigorously the protocol of the physical education and sport class is applied, the weaker collaboration and communication relationship. The relationship between variables is average and negative (Cohen, 1988). There is a probability lower than 1 to 100 of obtaining an r of -0.466 if there were no correlation between the two variables.examples.

Keywords: relationship; protocol; communication; teachers; students; physical education and sports.

Introduction

Until 1950, the discipline *Physical education and sports* was not part of the higher education curriculum. Officially, physical education becomes more concrete as a discipline in 1950, when it becomes compulsory in all curricula, including that of higher education, for the two first study years. At the same time, there were also formed special departments.

The faculties that have included *Physical education and sports* in the curriculum for the academic year 2017-2018 are, in alphabetic order, the following: the Faculty of Biology, the Faculty of Chemistry, the Faculty of Law, the Faculty of Economics and Business Administration, the Faculty of Physics, the Faculty of Geography and Geology, the Faculty of Computer Science, the Faculty of History, the Faculty of Letters, the Faculty of Mathematics, the Faculty of Psychology and Education Sciences. This means 11 out of the 15 faculties within „AL. I. CUZA” University in Iași.

The faculties of Orthodox Theology, Catholic Theology and Philosophy and Social-Political Sciences are faculties that do not have the *Physical education and sport* in the curriculum for the academic year 2017-2018, and the Faculty of *Physical education and sports*, more precisely the students within this faculty were not included in the research.

We mention the fact that all faculties stated above have the *Physical education and sports* as a facultative discipline and it may be attended by students during their two first study years. The grade does not contribute (it is not calculated) to the final means.

In this research, we tried to assess the students’ opinion regarding the *Physical education and sports* discipline, the material basis of the Faculty of Physical Education and Sports and mostly concerning the relationship with the Department of Physical Education and Sports (the professors) and most importantly, the relationship with their particular professor.

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Organization and phases of the research

The research took place during January 12 – April 21 2018. We applied the questionnaires in the Faculty of Physical Education and Sports, in the D building of „AL.I.CUZA” University in Iași.

The research purpose is to emphasize the relationship between the students within „AL. I. CUZA” University in Iași, who chose the *Physical education and sports* discipline and FEFS-UAIC Iași, the faculty „offering” this discipline (professors and material basis).

The research tasks are as follows:

- verifying the number of groups for each faculty within UAIC Iași for the *Physical education and sports* discipline;
- verifying the list of students who chose *Physical education and sports*, and the situation of these groups (there may be up to 25 students in a group);
- determining the research population;
- determining the research group;
- elaborating the questionnaire;
- applying the questionnaire;
- interpreting the data after applying the questionnaires.

The research hypotheses are:

- 1) We assume that between the students who have chosen the *Physical education and sports* discipline and the professors (at FEFS-UAIC Iași) there is a *good* collaboration and communication relationship.
- 2) We believe that the protocol of the *Physical education and sports* class is *beneficent* for the activities within the class.
- 3) We believe there is a degree of positive correlation between the protocol of the physical education and sport class and the teacher-student relationship.

Methods

As research method we used the sociologic inquiry in the „field”. The sociologic inquiry may be defined as a research strongly oriented towards field facts (Miftode, 1995, p. 60).

As research instrument, we used the questionnaire.

The research population and group

The research population is represented by the 1400 students at 13 faculties within „AL. I. CUZA” University in Iași, in the two first study years that chose the *Physical education and sports* discipline. The research population is presented in table 1.

We established the group through *simple random echelon*, according to which all elements of the main population of group have the same probability of being selected (Zaiț, Spalanzani, 2006, p. 156). We applied around 300 questionnaires, and out of these we „homologated” 280 for the research (20% out of all the population of students).

We mention that there was also a pre-testing on 30 students.

Table 1 The research population

Nr. crt.	FACULTY	No. of groups	No. Of students
1	Faculty of Biology	2	50
2	Faculty of Chemistry	6	150
3	Faculty of Law	6	150
4	Faculty of Economics and Business Administration	15	375
5	Faculty of Physics	2	50
6	Faculty of Geography and Geology	6	150
7	Faculty of Computer Science	6	150
8	Faculty of History	2	50
9	Faculty of Letters	2	50
10	Faculty of Mathematics	2	50
11	Faculty of Psychology and Education Sciences	2	50
12	TOTAL	56	1275

The questionnaire and the questions within the questionnaire

The questionnaire is the technique of collecting data through which we obtain written answers on a written support.

The instrument used in this technique has the same denomination: questionnaire. The questionnaire, as instrument, is the bearer of questions and answers, and also of explanations (if such is the case), that the researcher should offer to the subject in order for him to fully express his opinions (Zaiț, Spalanzani, 2006, pp. 166-167).

This questionnaire has nine close questions. Question 8 is a closed dichotomic question with two yes or no variants.

The eight other questions are multiple choice close questions.

The questionnaire uses *attitude scales* which allow the transformation of qualitative information in quantitative data. Characteristics as notoriety, acceptance degree (in our case, the protocol of the physical education and sports class), the relating degree (in our case, the following relationships: student-student, student-professor, student-Department of Physical Education and Sport, FEFS-UAIC Iași), the effectiveness of an advertising theme etc. are the ones for which such scales are used.

From all the attitude scales, we used the *gradual scale*, with five levels having gradually dispersed intervals (for example from „Excellent” to „Lamentable”).

Example of question used in the questionnaire: *How do you evaluate the professor-student relationship during the Physical education and sports class?*

Excellent	Good	So so	Weak	Lamentable
5	4	3	2	1

The student should then choose one of the variants.

Results

Each item within the questionnaire is reliable, because its Cronbach-Alpha coefficient (generated through SPSS 13.0) exceeds the validity degree of 0.6 (Malhotra, 1996).

The degree/level of pleasure of practicing the physical education and sport class was measured through item 1, while research results show that more than 57% of the population practice physical education with pleasure. (fig. no. 1)

Communication and the relation between teachers and students during the physical education and sport class were measured through items 5 and 7.

Concerning the teacher-student relationship, during the physical education and sport class, we have obtained the following results: 4.64% consider it weak; 18.21% of the population have a neutral opinion; 29.29% consider it good and 47.86% excellent. (fig. no. 2)

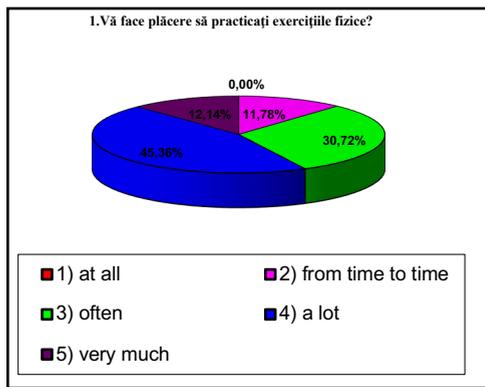


Fig. no. 1 The pleasure of practicing physical exercise

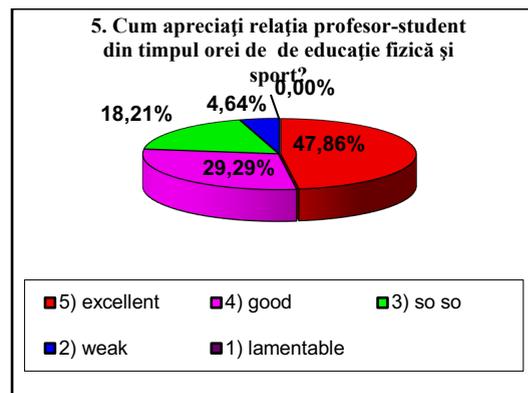


Fig. no. 2 The teacher-student relationship

Communication between teachers and students is considered lamentable by 1.42% of the population, weak by 11.08%; a percentage of 9.64% have a neutral position, while 41.08% have a good communication and 36.78% excellent communication. (fig. no. 3)

The protocol (norms regarding body protection) of the physical education and sport class is perceived by the research population as being: bothersome for 6.85%; useless for 35.48%; unimportant for 17.34%; it is considered beneficial by 30.24% and very useful by 10.09%. (fig. no. 4)

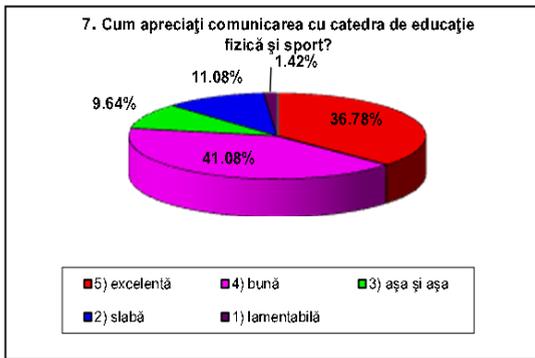


Fig. no. 3 Communication student – teacher

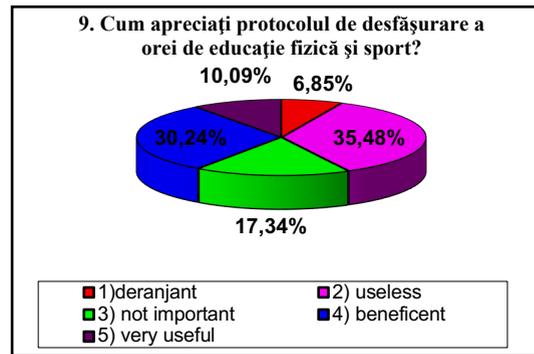


Fig. no. 4 The protocol of physical education and sports class

We observe that 59.67% of the population believe that the protocol is useless, bothersome or unimportant and only 40.33% consider it beneficial or very useful.

Testing the hypotheses:

Hypothesis 1 (We assume that between the students who have chosen the *Physical education and sports* discipline and the teachers at FEFS-UAIC Iași there is a *good* collaboration and communication relationship) is assessed through the items 5 and 7 and it may be stated that it was confirmed. A percentage of 77.15% of the research population consider that the relationship with the teachers is good or excellent, while 77.86% believe they have a good or excellent communication with the teachers at the FEFS UAIC Iasi.

Hypothesis 2 (We believe that the protocol of the *Physical education and sports* class is *beneficial* for the activities within the class) is assessed through item 9 and we have concluded it was not confirmed. A percentage of 59.67% of the research population believe that the protocol of the physical education and sport class is bothersome, useless or unimportant.

Hypothesis 3 (We believe there is a degree of positive correlation between the protocol of the physical education and sport class and the teacher-student relationship) was assessed through Spearman's coefficient (generated through the SPSS 13.0 soft) and it was not confirmed. The results obtained determined a Spearman Coefficient of $r = -0.466$ ($p = 0.01$; $\text{sig} = 0.000$), which means that there is a negative, directly proportional relation between the two variables. The more rigorously the protocol of the physical education and sport class is applied, the weaker collaboration and communication relationship. The relationship between variables is average and negative (Cohen, 1988). There is a probability lower than 1 to 100 of obtaining an r of -0.466 if there were no correlation between the two variables.

Conclusions

A percentage of 77.15% of the research population consider that the relationship with the teachers is good or excellent, while 77.86% believe they have a good or excellent communication with the teachers at the FEFS UAIC Iasi.

A percentage of 59.67% of the research population believe that the protocol of the physical education and sport class is bothersome, useless or unimportant.

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Effects of General Strength Improvement on Rugby Game Efficiency

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Abstract

The research was carried out on a number of 14 players forwards of the junior rugby team II CS CLUJ UNIVERSITY, which evolves in the national championship. The period in which the research was conducted includes the second preparatory macrocycle, the basic and precompetitive mid-cycle (January 5, 2018 and ended March 4, 2018). In the first five micro cycles of preparation were used mostly predominant drive systems, the transition to the three microcycles at the end of the training period, in which specific drive systems were used, which were performed with mixed means. Four training sessions were performed on a microcycle, the duration of each being between 30 and 40 minutes. The first test was made on January 3 and 4, 2018, at the beginning of the basic mesocycle. The second test was conducted on February 5 and 6, 2018, after the completion of the basic mesocycle and before the start of the competition midcycle. The third test was conducted on March 6 and 7, 2018, after the precompetition period, with the team going to be in the championship on March 8, 2018. The control samples were selected for both the upper and lower train muscles and the trunk muscles. The tests were chosen to obtain a real value that is as little influenced by the conditions of supporting the evidence and not depending on the material conditions. They also respect the control rules imposed by the federation. The present paper has contributed to the optimization of the force development of the junior rugby players II, and by proposing general and specific working means. The obtained results highlight the value increase of the force index after using the drive systems proposed in the paper. Thus, it can be seen that the averages obtained at all samples had a positive evolution from the initial testing to the final test.

Keywords: rugby, motor skills, strength, development, efficiency..

Introduction

In all its contents, this work aims to combine, interweave, the inherited experience - translated by classical means - on physical training and the development of strength in the rugby game, as an integral and necessarily necessary part of the forerunners, with the latest discoveries and innovations in the field.

There is still an old rugby prejudice that considers massive, heavy and strong forerunners to be a special technical tactic, that it would not have to do with the play of treasfery - "light cavalry", sprintful, intelligent and fanciful.

The recent evolution of the modern game has completely denied this mentality, according to which forerunners would have only well-defined tasks and activities - to supply as many balloons as possible; but an ancestor can mark as many essays as a center, or a wing of treisfers, for example - and practice has demonstrated it, or it can turn, depending on the requirements of the game in the third-quarter player.

And all these must be accomplished on the basis of complete and complex physical training, in which the role of force is not to diminish, to defeat the values of the other necessary motoring qualities (speed, resistance, flexibility), but to harmonize with them, to ensure the process training, to achieve the proposed goal.

In view of the above, this paper proposes as a hypothesis: if we use modern general and specific actuation systems, then the motor-force quality at the level of advancement will be optimized. The subjects being members of a junior team, the work tries to show the level of training of these players, a level that is intended to be a guarantee for the future of this game in our country. The elaboration of the work also started with the idea of creating a comparatively critical concept, regarding the appreciation of some rugby games in our country and some "outsiders", watched through the television in recent years, desiring and aspiring to high-level matches both in the country, as well as in international meetings. This ideal is according to the possibilities and talents of the Romanian rugby; we must be able

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to enforce the dedication, the endeavor, the intelligence and the skill that the training work in this game involves, both at the players level and as the sole justification for the quality of coach and instructor.

Establishing research conditions

The research was carried out on a number of 14 players in front of the junior rugby team II CS CLUJ UNIVERSITY, which evolves in the national championship. The period in which the research was conducted includes the second preparatory macrocycle, the basic and precompetitive mid-cycle (January 5, 2018 and ended March 4, 2018). In the first five micro cycles of preparation were used mostly predominant drive systems, the transition to the three microcycles at the end of the training period, in which specific drive systems were used, which were performed with mixed means. Four training sessions were performed on a microcycle, the duration of each being between 30 and 40 minutes. The first test was made on January 3 and 4, 2018, at the beginning of the basic mesocycle. The second test was conducted on February 5 and 6, 2018, after the completion of the basic mesocycle and before the start of the competition midcycle. The third test was conducted on March 6 and 7, 2018, after the precompetition period, with the team going to be in the championship on March 8, 2018.

The conditions in which the players were selected and the criteria for their inclusion in the research were:

- the homogeneity of the competitive experience, the players
- homogeneity of the somatic aspect
- the morpho-functional aspect of the musculature
- the voluntary and freely agreed consent to the research

Table 1. Subjects of the research

Subject	Age (years)	Weight (kg)	Height (m)	Post	Years in rugby (years)
S.M.	18	78	1,76	Stâlp	3
I.A.	19	76	1,75	Stâlp	4
V.M.	18	72	1,77	Stâlp	3
R.Z.	18	75	1,77	Stâlp	2,5
B.A.	19	78	1,80	Trăgător	3
A.A.	18	75	1,78	Trăgător	2
T.D.	18	85	1,97	Linia a II-a	3
F.D.	18	96	1,82	Linia a II-a	3
V.S.	18	83	1,85	Flanker	3
N.S.	19	80	1,87	Flanker	3,5
T.M.	18	86	1,86	Flanker	3
B.D.	18	75	1,86	Flanker	3
V.M.	18	83	1,82	Flanker	3
S.M.	18	80	1,93	Nr. 8	3

Presentation of control problems

The control samples were selected for both the upper and lower part of muscles and the trunk muscles. The tests were chosen to obtain a real value that is as little influenced by the conditions of supporting the evidence and not depending on the material conditions. They also respect the control rules imposed by the federation.

These samples are:

- For upper limb muscles:
- Suspensions
- For trunk muscles:
- Dorsal trunk flexes
- Extensions of the back
- For lower limb muscles:
- The Sargent test
- Genuflexions with a dumbbell on your shoulders

Samples chosen for upper body muscles aim to highlight the quality of upper limb muscles, often requested during a match, in the fight with one or more opponents.

For the two samples a fixed bar is needed but a diameter of 2-4 cm; the bar is fixed to a height that does not allow the subject to touch the ground with the feet in the hanging position.

traction

- the subject jumps and grasps the fixed bar, hands are dorsally facing the performer (in prone)
- the body stays motionless, the arms in the extension
- executing as many traction as possible
- Chin reaches above the bar
- between traction - the full extension of the arms

suspensions

- the subject jumps, grabs the bar and executes a traction. Keep this position for as long as possible, according to the maximum possibilities of each subject
- it works with the timer, it starts when the body becomes immobile
- During the maintenance, the chest is not in contact with the chin, the chin over the bar
- The duration of maintenance is measured in seconds

For the trunk muscles the proposed samples try to assess the tonicity and the endurance of the trunk muscles, namely the abdominal and back muscles. These samples do not require apparatus and can be run in groups of two.

Trunk Limbs:

- The player is lying down, his hands on his head and his lower limbs fused at 90 °
- The contractor's partner is blocking his knees
- On the signal, the player runs as many trunk flexions as 40 seconds
- elbows touch knees
- The timer triggers the signal, the time being announced from 5 to 5 seconds

Extensions of the facial lump trunk

- the subject is facial, the hands on the neck, the lower limbs stretched
- The partner blocks the performer's heels
- triggers the timer to the signal and attempts to execute as many trunk extensions as possible over 40 seconds

For the lower train muscles, the two proposed tests seek to assess the explosive strength of the lower limbs (detenta). For the Sargent test a vertical wall is required from 1.5 to 3.5, from 5 to 5 cm. For flats with the shoulder strap, a flat surface and a bathrobe are required.

The Sargent test

The sample consists of two measurements:

- the first is a statistical measure, which is executed as follows: Place the subject near the wall, with the legs close and with the arm from the graduated side up; the maximum height that can be reached with the stretched arm is measured
- the second measurement is of a dynamic type, performing as follows: placing the subject with the legs widely and slightly elongated; a jump is performed concurrently with the arm width on the graduated side; seek to achieve maximum height.

Three consecutive attempts are run, with the best attempt being made. The difference between the two measurements is made, thus the value of the detent is obtained.

Genflexions with dumbbell on shoulders

Standing with the weight of 60 kg on the shoulders is performed a maximum number of genflexions, noting the achieved performances; after the last genflexion the performer is assisted by a teammate.

Data recording will be followed by their processing and interpretation, at the level of the observation files, of the centralizers made up of them, which will be analyzed statistically and graphically, providing a quantitative and qualitative interpretation.

The experiment was put into use at the beginning of the modern age. The experimental method is a complex system of knowledge of reality, characterized by the use of "experimental reasoning", which processes both observations and experiments. The experiments consist of carrying out experiments that follow checking or controlling an experimental idea.

It involves an active state of the subject, involves a methodical activity oriented towards the precise purpose of verifying a hypothesis. It is a complex activity with a premeditated character based on a logical reasoning, which presupposes from the researcher the challenge, organization, interpretation and understanding of the phenomena .

The experiment is defined as verifying a supposed relationship (given in hypothesis) between two phenomena by provoking and controlling them by the experimenter.

Typology of the experiment. Depending on its particularities we observe the following:

- Exploration experiment aimed at discovering a possible relationship between two variables;
- verification experiment to confirm a previously formulated hypothesis;
- The pilot experiment, in fact, is a general repetition;
- the functional experiment that establishes the functional relationship between an independent and another dependent variable;
- Factorial experiment using a single variable and recording its effects;
- experiment, the researcher produces the independent variable and observes the effects;
- experiment in which the independent variable is active without the researcher's intervention;
- natural experiment and laboratory experiment;
- longitudinal and transversal experiment, in the second case, research of a variable simultaneously into several groups, and in the first case, the research of a variable in a single group ontogenetic evolution;
- The crucial experiment aimed at selecting a hypothesis or contradictory theory.

The stages of experimental research are:

- Establishing the theme in relation to requirements, possibilities and researcher;
- choice of variables according to advanced assumptions;
- establishing the experimental situation
- the composition of experimental and control groups, as appropriate;
- manipulation and measurement of variables;
- processing of experimental data;
- drawing up the research report.

The experiment also involves the existence of experimental plans. In the experiments the researcher acts on the variables: situation and personality. Thus the experimental plans are:

- with one variable and has two cases: equivalent groups for each value of the independent variable and one group for all values of the variable;
- Two or more variables, also referred to as factorial plans.

At the end of the experiment, the data processing and interpretation will be done, both quantitatively and qualitatively, following the verification of the research hypothesis using the null hypothesis, which certifies the veracity of the results, whether random or not.

The present research is both a longitudinal and a verifying experiment, using a single-variable experimental plane and a single group of subjects.

Methods

We used the measurement method to obtain the necessary data "to know as accurately as possible the effects of practicing physical exercise" - as defined by Univ. Adrian Dragnea measurement - in the three tests: initial, intermediate and final.

The data thus obtained were processed and interpreted statistically and mathematically on the following indicators:

a - the mean: $X = (X) / n$

This is the most used indicator, providing the most accurate data on the central trend.

b - amplitude: $W = X_{max} - X_{min}$

The indicator helps us to assess the extent of data spreading and the level of homogeneity

c - standard deviation:

This indicator shows the individual deviations from the arithmetic mean to fit into a normal distribution.

d - coefficient of variability: $Cv = s / X * 100$

This coefficient makes it possible to compare the homogeneity level of two or more distribution series or to be expressed in different units of measure.

These three indicators (standard deviation, amplitude and coefficient of variability) are indicators of distribution.

E - the significance of the difference between data strings in correlated samples:

The student test for correlated samples allows us to see if differences in a training course are significant.

Results and dicussions

Tractions

Following statistical and mathematical processing of the data obtained in each of the three tests, values resulted that give us a clear picture of the group at the traction sample.

Thus, an oscillation of the coefficient of variability can be observed, starting from the value of 2.27 in the initial test (which in terms of the statistical and mathematical interpretation translates into a high homogeneity), passing to the intermediate test at 24.35 which means a low homogeneity) and arriving at the last final test at 15.5 (which is an improvement, a recovery from the previous test, because in terms of statistical mathematics this value is interpreted as a relative homogeneity).

This oscillation of the traction sample value is the result of the large difference between the maximum and minimum individual values. This is seen from the fairly large amplitude values in the three tests. As a result of the training, a positive evolution of homogeneity can be observed for the described sample. Positive values of the arithmetic mean, which have an increasing order from the first to the last test, can also be considered. Student Values show significant differences of 15%.

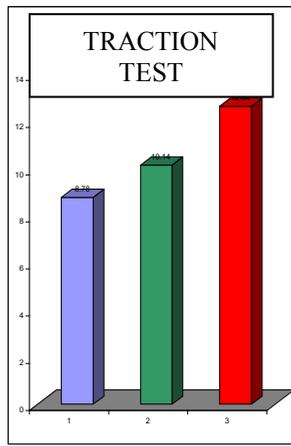


Figure 1 Traction Test

Suspensions

The continued decrease in the maximum and minimum tooth difference from 15 to 13 in the suspension sample, although insignificant, also has implications for decreasing the value of the coefficient of variability from 13.74% to the initial test at 13.25% at intermediate testing and 12.96% on final testing.

Standard deviation values fall within normal deviations from arithmetic averages; these environments have an increasing evolution from the first to the last test, which is also positive for the appreciation of the group and, implicitly, the importance of the training process in that period.

It is noted that the values obtained for the distribution indicators at the suspension sample have an increasing trend, which is positive for the homogeneity of the group (in this sample the group maintains a relative homogeneity).

Differences in the Student test and interpreted by Fischer's table are also significant in the respective internship.

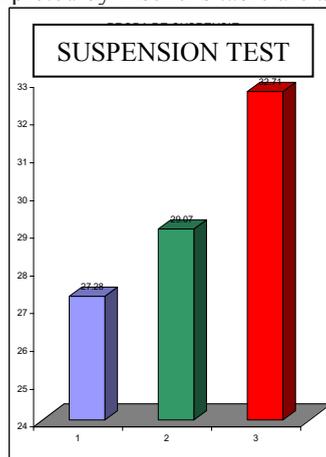


Figure 2 Suspension test

Dorsal Cutting Flexes

Following the values obtained in the three tests, a high homogeneity can be observed, unlike the traction and suspension samples. This is highlighted by coefficients of variability: 9.43 in initial testing, 9.12 in intermediate testing and 7.88 in final testing.

It can also be observed the continuous decrease in the value of the coefficient of variability, which demonstrates a certain efficiency in the sense of improving the homogeneity. Although the amplitude value of 10-11 abdomens seems quite large, it is non-comparative, for example, with a difference of 10 tractions between the maximum and the minimum value at that sample.

Standard deviation values are also lower than in traction and suspension samples, so the deviation from the arithmetic mean is lower.

One thing that advocates the effectiveness of the means used is increasing the arithmetic mean value from one test to another, as well as the 18.51 value of the Student test. This demonstrates significant differences in the training during that period.

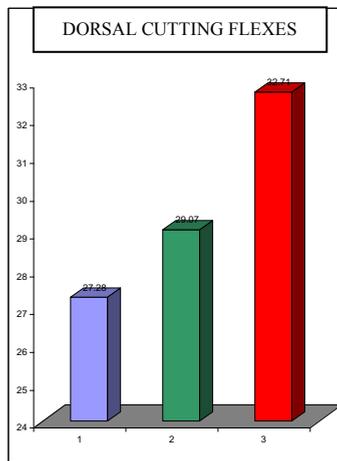


Figure 3 Dorsal Cutting flexes

Student Test

In the Student test, after data processing, the results obtained (which reflect the values of detention) differ from the values of trunk samples in terms of the coefficient of variability: this translates into the homogeneity of the group, approaching the values recorded in the suspension sample. Homogeneity is relative, given the values of 11.63 in the first test, 11.01 in the second and 11.86 in the third.

As with the traction test, there is an oscillation of the value of the coefficient of variability, and the result of 11.86 in the final test (slightly higher than 11.01 obtained in the intermediate test) reveals a slight decrease in homogeneity, however insignificant. This is also due to the fact that between the two tests, we recorded absences of some subjects, two of them having for a short period of medical problems. We have, however, seen a visible increase in average from one test to the other, the standard deviation values for the maize falling within normal limits. The amplitude values for this sample, although relatively large, are explained by the nature of the posts occupied within the forwarding package; the differences obtained during this stage are significant, which is a positive thing in this preparatory phase.

Grabbing with the dumbbell on his shoulders

Following verification of the level of development of lower limb muscles, this test obtained values that mirror the image of the results obtained in the three tests in most control samples. Astel, we can see a positive evolution of the arithmetic mean value, the deviation from this average being somewhat lower compared to the rest of the samples. The values of 1.75 in the second test, or 1.95 in the third test, are much lower than, for example, those in the suspension sample (3.75, 3.85 and even 4.23).

In the first test the coefficient of variability (10,06) does not exceed the percentage of 10% to which we can talk about a large homogeneity of the group. Its value improves on the second test (5.98%) and even on the third one (6.13% represents an insignificant increase compared to the second test, due to objective reasons).

The Student Test is also on a positive line with regard to the effectiveness of the training during the training period, the differences being significant in the proportion of 85%.

Conclusions

Over time, force has received several definitions, namely:

- after A. Demeter, the force represents "the ability of the neuromuscular device to overcome motion resistance, based on muscle contraction."
- after VM Zatorski, the force is "the ability of man to manifest through muscle effort certain values of strength: to overcome (with shortening or stretching of the muscles), to maintain (without changing the length of the muscles), or to yield (with the modification of the length muscles).
- According to other authors, the force is defined as: "the acquisition of muscle tissue to develop a strain under the action of external and internal exciters"; "The ability of the body to lift, carry, push, pull some weight based on muscle contraction."

The present paper has contributed to the optimization of the force development of the junior rugby players II, and by proposing general and specific working means. The obtained results highlight the value increase of the force index after using the drive systems proposed in the paper. Thus, it can be seen that the averages obtained at all samples had a positive evolution from the initial testing to the final test. The standard deviation values give us a clear picture of the fact that the results fall within normal limits of deviation from the arithmetic mean for each sample. Knowing that for a coefficient of variability between 0-10%, the homogeneity of the group is high, between 10-20% the group is relatively homogeneous, and over 20% the homogeneity is small, it can be seen that the homogeneity of the study group is high. An exception is the traction test, where we have a fluctuation of the variability coefficient value, from the initial testing (2.27%) to the intermediate (24.35%) and the final one (15.5%). This is due to the significant difference between the maximum and minimum individual values in this sample. The data obtained from the "t" student computation were compared to those in the Fischer table for $t = 2,160$ and $p = 0,05$, resulting in the difference between the obtained values being real, which shows a high degree of confidence. After interpreting these data, it can be concluded that the drive systems proposed in this paper are effective for developing general and specific strengths for junior I rugby players and may be recommended to use them in training practice. The whole research work for data processing, processing and interpretation has helped to improve my didactic and pedagogical experience.

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The Effectiveness of Physical Therapy in Improving Psycho-Motor Skills in Children with Down Syndrome

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Abstract

This paper presents a study conducted on a group of 13 subjects (7 males and 6 females), with the clinical diagnosis of Down syndrome, between 6 and 14 years old. The research was conducted between March and December 2017, the practical assessment consisting in applying the test "Clinical Observations of Neuromotor Performances". The specific objectives were to: increase the muscle strength and endurance; educate and rebuild the body image and scheme, the laterality, the spatial-temporal orientation and organization; increase the stability, balance, control, and coordination. The physical therapy programs consisted in: maintaining the acquired postures and positions and performing active movements during it, continuing the already known movements, using alternate global and segmental movements, proprioceptive neuromuscular facilitation, therapeutic physical exercises during applicative tracks, improving stability, balance and perceptive-motor coordination throughout the strategy, going from static to dynamic balance, the subjects becoming aware of their body scheme, laterality and temporal-spatial orientation, improving their skills during their daily life activities. At the end of the physical therapy intervention on the Down syndrome patients, the initial psycho-motor deficiencies were diminished. After analyzing the results recorded by the entire group of subjects for the test "Clinical Observations of Neuromotor Performance", I observed that by using the physical therapy intervention, the "sensory perception" and "postural reactions" have improved by 4 points out of a total of 8, the "bilateral motor abilities", by 5 points out of 6, and the criteria "somatopraxis" and "other clinical observations" by 2 points out of 4. The great majority of the subjects have improved their neuro-motor results by over 80%, the smallest progress being recorded by subject 9 (an improvement of 54.8%), while the biggest progress, by subject 5 (96.77%). This reduction of the number of difficulties indicates that the subjects recorded a remarkable progress in regard to their neuromotor abilities.

Keywords: deficiencies, body scheme, temporal-spatial orientation, coordination;

Introduction

The abilities of children with Down syndrome are different than the ones of children without disabilities, because they develop relatively slowly, and their motor schemes are developed later. Pereira et al. (2013) think that it is essential for one to identify the neuromotor development stages of the children with Down syndrome, in relation to their chronological age in the first 12 months of their life, because this is the time where they acquire the most important skills for their future psycho-motor development. The neuromotor retardation was blamed on the mental deficit, which leads to specific motor problems caused by the complex symptoms encountered in the case of this syndrome. Some authors – Crome (1965), Benda (1960), Colon (1972), Toiber et al. (2010), have discussed the fact that the brain neuro-anatomical anomalies lead to abnormal aspects of motor skills, such as a deficit in balance, laterality, movement coordination, reduced muscle tone, etc. In order to correct the specific Down syndrome deficiencies, one needs an early interdisciplinary therapy (Harris, 1980), thus helping a correct formation of basic motor skills and psycho-motor development (Connolly & Fay Russel, 1976; Connolly et al., 1980; Harris, 1981). Uyanik, Bumin and Kayihan (2003) have compared the effects of multimodal therapies (vestibular stimulation, sensory integration therapy, and physical therapy) on a group of 45 children with DS. The conclusions of the study have proven the effectiveness of the three therapies in the neuromotor development of children with DS, the results being superior if these therapies are combined and not applied individually. González-Agüero et al. (2012), Gupta, Bhamini and Kumaran (2010) have proven that after applying a therapeutic program, one can improve the bone density, muscle strength and balance in children with Down syndrome. Haley (1987), Ulrich et al. (2008), Smith et al. (2007) have proven that the systematic practice of walking helps improve posture control, thus reducing the substitution uncoordinated movements, improving the psycho-motor development.

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Material and methods

The hypothesis of this study was that, presumably, through an intervention using physical therapy means, one can contribute to the improvement of psycho-motor skills of Down syndrome children, and an individualization of the treatment - capitalizing on a series of processes that are specific to that age, such as the playful component, harmonious physical development, the child's need for assertion, etc., will lead to faster beneficial results and to a positive integration of the children in their social environment.

The experimental study was conducted on a group of 13 subjects (7 males and 6 females), with the clinical diagnosis of Down syndrome, between 6 and 14 years old, between March and December 2017, within the Syndrome Association of Bacau.

The types of assessment were: the predictive assessment (initial), the written/oral questioning envisaging the patients' general health and the deficit that needs rehabilitated, and the final summarizing assessment conducted through the same means as the predictive one, adding only a comparative analysis with the previously recorded results, establishing whether the rehabilitation should continue, or other measures should be taken, as follows:

The anamnesis played an important role in knowing the general symptoms (the main affected areas), the education level, as well as the existence of associated pathological aspects (mental retardation, internal diseases, etc.), in establishing the therapeutic conduct, based on the analysis of the patient's reaction to the previous interventions and their particularities. The data was collected from the closest and most involved people in the child's environment (parents, teacher, psychologist).

Knowledge of the *family situation* was essential and it allowed the collection of data from the physical, social, and personal environment about how the subjects are, involving family members in relation to the subjects, their attitude and relationships. The data can show a positive or negative influence in the child's development.

Regarding the *general physical examination*, the focus was towards a somatoscopic (constitution, nutritional state, physical appearance, appearance of the integumentary system, body posture, psychological and nervous reactivity).

In order to establish the neuromotor performance level, the Clinical Observations of Neuromotor Performance test (Bundy, Lane & Murray, 2002) was applied.

The physical therapy rehabilitation goals are *general* and *specific*, and were set in agreement with the psycho-motor components (body scheme, laterality, balance, perceptive-motor coordination, ideomotor skills, ability and quickness of movements, general dynamic segmental coordination).

The specific objectives of the physical therapy program were to: increase the muscle strength and endurance; educate and rebuild the body image and scheme, the laterality, the spatial-temporal orientation and organization; improve the stability, balance, control, and coordination.

The content of the physical therapy programs comprised: various ways of triggering motor acts and actions, maintaining the acquired postures and positions and performing active movements during it, continuing the already known movements, using alternate global and segmental movements, proprioceptive neuromuscular facilitation, therapeutic physical exercises during applicative tracks, improving stability and perceptive-motor coordination throughout the strategy, going from static to dynamic balance, the subjects becoming aware of their body scheme, laterality and temporal-spatial orientation, improving their skills during their daily life activities.

Physical therapy strategies

Next, a model of a generalized physical therapy program is presented (each subject benefited from the individualization and particularization of the intervention) over the course of the research, taking into account the treatment goals and the psycho-motor skill components that are deficient in these children.

In order to improve the muscle strength, every important muscle group was analytically worked, individually and as a whole. In the upper limbs, the strengthened muscles were the biceps brachii; in the back, the latissimus dorsi, the rhomboids, the quadratus lumborum; in the thorax, the pectoralis major; in the hip, the gluteus maximus, the iliopsoas, the lateral rotator group; and in the lower limbs, the adductor muscles, the tensor fascia lata, the quadriceps, the hamstrings, the sartorius, the triceps surae, the tibialis anterior, and the peroneus muscles. The following were chosen as means to achieve this specific goal: isotonic concentric and eccentric exercises, isometric exercises, PNF techniques - repeated contractions (RC), slow reversal (SR), slow reversal hold (SRH), agonistic reversals (AR), both analytically and as a whole, associated with the Kabat flexion (D1F, D2F) and extension (D1E, D2E) diagonals. This way, the muscles work more than the movement of the segment would require. The muscle tension is increased, and as a result, the strength is increased with its hypertrophy, a process in direct correlation with the value of the muscle tension increase.

Physical exercises for improving the laterality

In order to separate the activities attributed to the dominant hemisphere or to the minor one, a battery of tests was applied, for the upper limb (e.g.: to ring a bell, to open and close the zipper, to divide some cards, etc.) and the lower limb (to kick a ball using the preferred leg/foot), because without testing, the laterality education process cannot start.

The experiment was focused also on the movement performance speed, the signal reaction time, and the precision of the movements. When the notions of right and left were properly internalized, the experiment moved on to their exemplification during certain exercises, simple at first then gradually more complex, the children being asked to verbalize their actions. The means used to develop the laterality consisted in physical exercises for the arms and legs, first separately, then by making the subjects use alternatively and simultaneously their limbs in various simple and complex motor acts.

Physical exercises for the education of the body scheme

Two basic procedures were used for the subjects to learn the body scheme: talking and action. In order for the children to understand the body scheme, the way in which the body parts perform certain functions, motor actions were introduced in the program that selectively involve their musculoskeletal systems. Through talking, a verbal image of the actions was formed, then the children had to name the parts of their own bodies, to show them looking in a mirror, and then to prove which are the functions of the systems: respiratory, auditory, visual, olfactory, etc. After learning all of these, the children had to perform various exercises: their hands were touched, the children performing all types of movements (flexion, extension, cubital and radial inclination, circumduction), etc.

Techniques for improving the stability

The methods and techniques used to improve the stability stimulate the articular proprioceptors and facilitate the contractions of the muscles with postural functions. To achieve this goal, the most beneficial methods and techniques were selected: from the Margaret Rood method, the articular pressure was applied along the body axis and extremities, with a weight larger than the body's. At the same time, proprioceptive neuromuscular facilitation techniques were used, such as rhythmic stabilization (RS), alternating isometrics, in a closed and open kinetic chain, from the positions: all-fours, kneeling, sitting, standing.

Physical exercises for improving the static and dynamic balance

In the children with muscle deficiencies, balance disorders are manifested by maintaining a position with a large support base in the case of the static balance, or slower, heavier, rigid walk, in the case of the dynamic one, because the body is positioned on a mobile surface, a situation in which the body and its segments must perform extra motions, and maintaining the balance is difficult, because the center of gravity is often in the situation of exiting the support polygon. The improvement of balance was done progressively, starting with static exercises and a large support base in all-fours, kneeling, standing positions, gradually reducing the support surface, furthering the center of gravity of the body or of its segments from the support base, heightening the support level during the positions and during walking, in relation to the ground, changing the usual movement procedure, modifying the speed and rhythm, going over obstacles or transporting weights, decreasing the sensory control, etc. In order to enlarge their understanding of the actions, the children were asked to verbalize every movement, particularly the ones related to how they maintain their bodies in a correct position, the way in which they perform steps, how they transport objects, etc.

Physical exercises for improving the coordination

Coordination is gained over time, through a large number of repetitions, and its development leads to precise movements and muscle effort economy.

To reach this goal, the study observed the formation and the development of polyvalent and polymorph gestures, of the basic motions in the upper and lower limbs, independently and in relation to the body, and the finalization of complex actions. For this, physical exercises were applied, which were previously demonstrated and performed based on verbal command, such as: maneuvering objects of various size and weight, with gradual and progressive speed and strength, the voluntary or on command modification of the direction, range, tempo and rhythm of movements, etc. For a progressive increase in intensity, automated movement schemes were used, to create new movement schemes, imposed by the children's psycho-motor progress.

Results and discussions

Because the physical therapy treatment was applied both individually and on the whole group of subjects, a series of aspects were considered, related to the history of each patient, the most important information from their medical charts being selected for this research.

What follows are the results recorded during the test "Clinical Observations of Neuromotor Performance", both individually and on the entire group of subjects. The examined components were the: "sensory perception", "postural reaction", "bilateral motor skills", somatopraxis, and the criterion "other clinical observations", as seen in Table 1.

Table 1. Centralizing table containing the results recorded during the test "Clinical Observations of Neuromotor Performance" by the group of subjects

Initials	Sensory perception		Postural reaction		Bilateral motor skills		Somatopraxis		Other clinical observations		Total score	
	T.I	T.F	T.I	T.F	T.I	T.F	T.I	T.F	T.I	T.F	T.I	T.F
C.M.	8	1	6	1	9	1	4	0	4	0	31	3
C.A.	8	2	6	1	9	2	4	0	4	0	31	5
B.D	8	1	6	0	9	1	4	0	4	0	31	2
N.A	8	2	6	0	9	1	4	1	4	0	31	4
M.I	8	1	6	0	9	0	4	0	4	0	31	1
D.A	8	1	6	0	8	1	4	0	4	0	30	2
F.I	8	0	6	1	9	2	4	0	4	0	31	3
O.I	8	1	5	0	9	1	4	0	4	0	30	2
G.A	8	4	6	3	9	4	4	2	4	1	31	14
B.A	8	0	6	1	9	1	4	0	4	0	31	2
D.I	8	2	5	1	8	1	3	0	4	0	28	4
B.D	8	2	6	1	9	1	4	0	4	0	31	4
R.A	7	0	5	0	8	1	4	0	3	0	27	1
Minimum	7	0	5	0	8	0	3	0	3	0	27	1
Maximum	8	4	6	3	9	4	4	2	4	1	31	14
Arithmetic mean	7,92	1,30	5,76	0,69	8,76	1,30	3,92	0,23	3,92	0,07	30,30	3,61

Data in Table 1 shows that in regards to *sensory perception*, the subjects recorded between 7 and 8 meaning that initially the subjects had, from the point of view of the sensory perception, 7 of the 8 problems that were assessed, or 8 of the 8 problems (gravitational insecurity, discomfort during movements, adverse reactions to tactile stimuli, hyper-reactiveness to smell, hyper-reactiveness to sound, distraction, unusually high activity level or difficulty during the transition between active and quiet activities). During the final testing, it can be seen that the minimal and maximal values were 0 and 4, respectively, which means that the subjects had between 0 and 4 of the neuromotor problems presented above. In regard to the *postural reaction*, one can see that initially, the minimum value was 5 and the maximum value was 6, which means that the subjects had 5 of the 6 problems or 6 of the 6 problems envisaging the postural reaction (difficulties in performing trunk extension against gravity; lordosis; elbow hyperextension or blocking; hyperextension of the knees in standing position, muscle hypotonia during palpation; the subjects do not maintain their heads or upper side of their bodies upright or they make postural adjustments with their arms to maintain their balance; their heads remain behind when they move their neck from a supine position; exaggerated, difficult, incorrect or diminished postural adjustments). During the final testing, the minimal and maximal values were 0 and 3, respectively, which means that the subjects had no postural problems or they had maximum 3 of the 6 problems previously presented.

The initial clinical observations of the *bilateral motor skills* have lead to results between 8 and 9 points, meaning the subjects had initially 8 of the 9 problems or 9 of the 9 problems envisaging the bilateral motor skills (sometimes they use their right hand and sometimes their left to perform the same activity; they mistake right for left; they have difficulties in catching the ball while jumping when they push themselves or when they vary the directions; they cannot jump with both legs at the same time, they divide the activity in separate jumps, ending the jump with difficulty; they are incapable of jumping, dividing the jumps into steps; during the jump they move their upper and lower limbs segmentally, or have difficulties during repeated jumps; they cannot balance their limbs simultaneously, or perform series of jumps; they are incapable to balance their limbs alternatively; they hit the moving object while they are trying to go over it). During the final testing, the minimal and maximal values were 0 and 4, respectively, which means that at the end, the bilateral motor skills have improved, with subjects who had no difficulty anymore, or they had maximum 4 of the 9 problems.

In regard to *somatopraxis*, during the initial clinical tests, the minimal value was 3, and the maximal 4, showing that the subjects had initially either 3 of the 4 problems, or 4 of the 4 problems that were assessed in this case (they are incapable to understand and maintain a position; they are incapable to touch their other fingers with their thumbs equally, visually monitoring their activity; they use both hands or place the object on the tale in order to manipulate it; they move various segments, but their bilateral coordination is deficient). During the final testing, the minimal and maximal values were 0 and 2, respectively, which means that the subjects had 2, 1, or no problems of the 4 that were previously presented.

Other initial clinical observations that can indicate frequent deficiencies in children with sensory integration dysfunctions have recorded minimal values of 3 and maximal of 4, meaning the subjects had initially either 3 of the 4

problems, or 4 of the 4 problems envisaged in this case (excessive nonessential movements when performing tasks corresponding to their stage of development; their touch their noses with diminished precision, above and below; they move their limbs segmentally or they are incapable to move both limbs simultaneously; they extend their limbs with a delay when they lose their balance; they move their weight with difficulty from one limb to another). The final clinical observations recorded minimal values of 0 and maximal values of 1, which shows that at the end, the subjects had only one or none of the problems stated above.

In regard to the total score, a sum of the scores of all assessments that were presented, its initial minimal value was 27 and the maximal one 31, while its final minimal value was 0 and the maximal one 14.

What comes next is an analysis of the frequency of the scores recorded by the subjects in each of the assessments of the neuromotor performances. There will also be an analysis of the progress of the frequency between the two phases of the testing: initial and final.

The sensory perception: initially, 12 subjects (93.21%) presented 8 difficulties, and one (7.69%) manifested 7 sensory perception difficulties. During the final tests, 5 subjects (38.46%) presented only one difficulty out of the 8, 4 subjects (30.77%) presented only two such difficulties, 3 subjects (23.08%) had no problem and 1 subject (7.69%) presented 4 sensory perception difficulties.

3.1. Assessment of the averages (initial and final) recorded in the case of the neuromotor tests applied to the Down syndrome patients

Table 2. Values of statistical parameters for the neuromotor tests conducted on the group of Down syndrome patients

		Arithmetical mean	No	Standard deviation	Standard deviation for the average
1	Sensory perception - initial	7.9231	13	0.27735	0.07692
	Sensory perception - final	1.3077	13	1.10940	0.30769
2	Postural reaction - initial	5.7692	13	0.43853	0.12163
	Postural reaction - final	0.6923	13	0.85485	0.23709
3	Bilateral Motor Skills - initial	8.7692	13	0.43853	0.12163
	Bilateral Motor Skills - final	1.3077	13	0.94733	0.26274
4	Somatopraxis - initial	3.9231	13	0.27735	0.07692
	Somatopraxis - final	0.2308	13	0.59914	0.16617
5	Other obs. Clinical - initial	3.9231	13	0.27735	0.07692
	Other obs. Clinical - final	0.0769	13	0.27735	0.07692
6	Total score - initial	30.3077	13	1.31559	0.36488
	Total score - final	3.6154	13	3.35506	0.93053

What comes next is a comparative analysis of the arithmetical means recorded during the initial and final tests of the group of patients, for each of the tests assessing the neuromotor performances.

Sensory perception. The initial arithmetical mean of the sensory perception difficulties was of 7.92, and the final one was of 1.31, which is an obvious progress, from 7-8 initial difficulties to 1-2 final difficulties.

Postural reaction. The initial arithmetical mean of the postural reaction difficulties was of 5.77, and the final one was of 0.69, which is an obvious progress, from 5-6 initial difficulties to 0-1 final difficulties.

Bilateral motor skills. The initial arithmetical mean of the bilateral motor skills difficulties was of 8.77, and the final one was of 1.31, which is an obvious progress, from 8-9 initial difficulties to 1-2 final difficulties.

Somatopraxis. The initial arithmetical mean of the somatopraxis difficulties was of 3.92, and the final one was of 0.23, which is an obvious progress, from an initial 3-4 difficulties to a final 0-1 difficulties.

Other clinical observations. The initial arithmetical mean of the other clinical observations was of 3.92, and the final one was of 0.23, which is an obvious progress, from an initial 3-4 difficulties to a final 0-1 difficulties.

Total Score: the initial arithmetical mean of the total calculated difficulties was of 30.31, and the final one was of 3.61, which is an obvious progress, meaning that initially the subjects had in average 30 difficulties, and finally, 4 difficulties, which indicates a progress of 26.7.

3.2. Results for the paired samples Student's t-test regarding the neuromotor tests

In order to see whether the differences recorded between the initial and final testing are statistically significant the paired samples Student's t-test will be applied, and the value of t recorded for each assessment will be compared to the value of t from Fischer's table for 12 degrees of freedom.

Table 3. Results for the paired samples Student's t-test

	Arithmetical mean	Standard deviation	Pair differences		T	Dif.	Sig. (p)
			Standard deviation for the average	95% the confidence interval Inferior Superior			
1 Sensory perception - initial Sensory perception - final	6.61538	1.04391	0.28953	5.98456 7.24621	22.849	12	0.000
2 Postural reaction - initial Postural reaction - final	5.07692	0.86232	0.23916	4.55583 5.59802	21.228	12	0.000
3 Bilateral Motor Skills - initial Bilateral Motor Skills - final	7.46154	0.96742	0.26831	6.87693 8.04614	27.809	12	0.000
4 Somatopraxis - initial Somatopraxis - final	3.69231	0.63043	0.17485	3.31135 4.07327	21.117	12	0.000
5 Other obs. Clinical - initial Other obs. Clinical - final	3.84615	0.37553	0.10415	3.61922 4.07309	36.927	12	0.000
6 Total score - initial Total score - final	26.69231	3.30113	0.91557	24.69746 28.68716	29.154	12	0.000

Sensory perception: the value of $t = 22.849$ is greater than the variable $t = 2.18$ from Fischer's table for $df = 12$ degrees of freedom, and a confidence threshold of 0.05 or 95%. This value of t , as well as the $p < 0.05$, indicate that the differences are statistically highly significant.

Postural reaction: the value of $t = 21.228$ is greater than the variable $t = 2.18$ from Fischer's table for $df = 12$ degrees of freedom, and a confidence threshold of 0.05 or 95%. This value of t , as well as the $p < 0.05$, indicate that the differences are statistically highly significant.

Bilateral motor skills: the value of $t = 27.809$ is greater than the variable $t = 2.18$ from Fischer's table for $df = 12$ degrees of freedom, and a confidence threshold of 0.05 or 95%. This value of t , as well as the $p < 0.05$, indicate that the differences are statistically highly significant.

Somatopraxis: the value of $t = 21.117$ is greater than the variable $t = 2.18$ from Fischer's table for $df = 12$ degrees of freedom, and a confidence threshold of 0.05 or 95%. This value of t , as well as the $p < 0.05$, indicate that the differences are statistically highly significant.

Other clinical observations: the value of $t = 36.927$ is greater than the variable $t = 2.18$ from Fischer's table for $df = 12$ degrees of freedom, and a confidence threshold of 0.05 or 95%. This value of t , as well as the $p < 0.05$, indicate that the differences are statistically highly significant.

Total Score: the value of $t = 29.154$ is greater than the variable $t = 2.18$ from Fischer's table for $df = 12$ degrees of freedom, and a confidence threshold of 0.05 or 95%. This value of t , as well as the $p < 0.05$, indicate that the differences are statistically highly significant.

As a result, the significance test shows that the results recorded in correcting certain deficiencies in children with Down syndrome through the physical therapy intervention were highly significant, which allows one to say that the initial goal was reached.

3.3. The progress recorded by the subjects during the Clinical Observations of Neuromotor Performance test

Figure 1 presents comparatively the progress recorded by the subjects following the physical therapy intervention (as a difference between the initial and final total score of the neuromotor difficulties). It can be seen that subject 9 progressed the least, only 17 of his initial problems being eliminated, while the most remarkable progress was recorded by subject 5, who in the end eliminated 30 of his initial 31 difficulties.

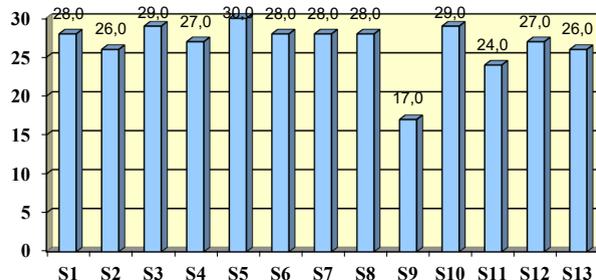


Figure 1. Progress recorded by the subjects at the Clinical Observations of Neuromotor Performance test

Figure 2 presents the same aspects, but expressed in percentages. It can be seen that the physical therapy intervention managed to improve the subjects' neuromotor performances by over 80%, the lowest progress being recorded by subject 9, who improved his neuromotor performances by 54.8%, and the highest progress being recorded by subject 5, who improved his neuromotor performances by 96.77%.

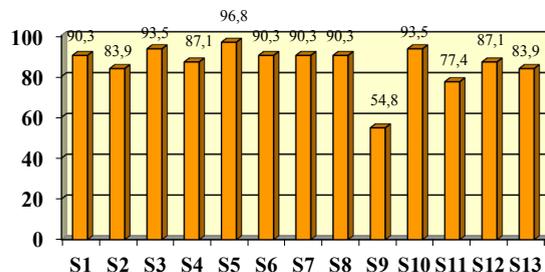


Figure 2. Progress expressed in percentages recorded by the subjects at the Clinical Observations of Neuromotor Performance test

Conclusions

At the end of the physical therapy program, it was noticed that the initial psycho-motor deficiencies have considerably diminished.

- If initially the subjects had muscle hypotonia, after the application of the physical therapy program focused on increasing muscle strength, stability and controlled abilities, the deficient psycho-motor components have improved, thus they succeeded in performing dynamic exercises, such as walking, running, and jumping. At the same time with an increase in the muscle strength, there was an improvement in the coordination and controlled abilities, the children being able to perform various daily activities more easily and more precise;

- The results recorded by the entire group of subjects for the test "Clinical Observations of Neuromotor Performance" have revealed that by using the physical therapy intervention, the "sensory perception" and "postural reactions" have improved by 4 points out of a total of 8, the "bilateral motor abilities", by 5 points out of 6, and the criteria "somatopraxis" and "other clinical observations" by 2 points out of 4. The great majority of the subjects have improved their neuromotor performances by over 80%. The lowest progress was recorded by subject 9, who improved his neuromotor performances by 54.8%, while the highest progress was recorded by subject 5, who improved his neuromotor performances by 96.77%.

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Physical Education and Sports in Romania. The Laws of Physical Education and Sport and Their Importance in the Development of the Field of Activity in the 1918-2018 Period

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Abstract

After the Great Union was established on 1 December 1918, the establishment of the legal framework for physical education and sport became more coherent. For a century (1918-2018), the governors adopted normative measures for the development of physical education and sports throughout the country, in the context of the multiplication of sports forms and activities - the establishment of national sports federations, the organization of national championships in various sporting sectors, the provision of an infrastructure (stadiums, gyms, sports land, etc.), the participation of Romanian athletes at major international events (Olympic Games, World Championships, European Championships, etc.). Taking into account the assertions and starting from the finding that in a modern society physical education and sport are activities of national interest supported by the state, we have proposed through this approach to make some clarifications regarding the organization and functioning of the national system of Physical Education and Sports in Romania between 1918 and 2018, working as a method of working the laws of physical education and sport promulgated in 1923, 1929, 1933, 1967 and 2000, as well as their importance in the development of the field of activity. The proposed approach seeks to highlight the legislative and organizational implications of physical education and sports in the context of political, economic, social and cultural changes at one or other stage (interwar period, communist period, post-December period). Also, through the content and layout of the information gleaned from a wide range of bibliographic materials, we aimed to appreciate in a realistic way the presence and the efficiency of the legislative documents adopted with a decisive role in the evolution of the Romanian movement during the mentioned period. After analyzing and interpreting the data presented, we find that in the mentioned period, 1918-2018, the specific legislation in the field was extremely diverse especially from the perspective of political and economic factors, where the role of the governors was more or less decisive in the development of physical education and sport in relation to the transformations of the Romanian society.

Keywords: legislative framework, organizational framework, national sports federations, governors, Summer Olympics, interwar period, communist period, post-December period

Introduction

Starting from the finding that in a modern society physical education and sport are activities of national interest supported by the state, we have proposed through this approach to make some clarifications regarding the organization and functioning of the national system of physical education and sport in Romania, between 1918 and 2018, working as a method of working the laws of physical education and sport promulgated in 1923, 1929, 1933, 1967 and 2000, as well as their importance in the development of the field of activity.

The present approach also seeks to highlight the legislative and organizational implications of the field of physical education and sport in the context of political, economic, social and cultural changes at one stage or another (interwar period, communist period, post-December period). At the same time, through the content and layout of the information gleaned from a wide range of bibliographic materials, we sought to appreciate in a most realistic way the presence and the efficiency of the legislative documents adopted with a decisive role in the evolution of the Romanian movement during the mentioned period.

Methods

On the working method - the case study, we have proposed through some bibliographic sources - edited documents (Official Bulletin, Official Gazette), working tools (Encyclopedia of Physical Education and Sport in Romania), specialized sites (www.cosr.ro; www.fro.ro; www.mts.ro) to show, from the current perspective, the importance and

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importance of the legislative measures adopted in different periods of evolution of the Romanian society - interwar, communist and post-December, with a role in the development of the field of activity, having as reference points:

- a) the legal framework, represented by the laws specific to physical education and sport;
- b) the organizational framework, represented by the national federations on the sports branch;
- c) the participation of Romanian athletes and the performances at the biggest sports event worldwide - the Summer Olympics.

I. Interwar period (1918 - 1940)

A. Legislative framework, represented by laws specific to physical education and sport

After the Great Union was established on December 1, 1918, the establishment of the legal framework for physical education and sport became more coherent, compared to the previous period (that of modernization, started with the Little Union from 24 January 1859 and continued until the Great Union). Therefore, the governors adopted normative measures to develop the field of activity at national level in the context of the multiplication of sports forms and activities - the establishment of national sports federations, the organization of national championships in various sporting disciplines, the participation of Romanian athletes at major international events (Olympic Games - 1924, Paris, World Championships - Football, 1930, Uruguay, European Championships - Box, 1930, Budapest, the mentioned years being the first Romanian participation in the respective sports events).

For the interwar period we identify three laws of physical education and sport, namely:

1. *The Law of Physical Education of 17 June 1923* (Official Gazette, 1923). By analyzing the text of the Law we can say that the document was of particular importance, containing basic principles and basic provisions specific to the field of activity, such as: physical education was a general obligation for all young people in our country until the age of incorporation, being taught in all school institutions and special structures; the creation of the National Office for Physical Education (hereinafter ONEF), representing the State, with the role of organizing and monitoring the proper functioning of the field of activity; the establishment of the National Institute of Physical Education in order to prepare the teaching staff for the teaching of physical education in educational structures - education and army, as well as the formation of the future leaders of the sports groups from the whole country. Concerning the national federations on the sporting industry, the Law does not provide details in this respect. However, it should be noted that until the promulgation of the Law of 1923 and the establishment of the ONEF, the organizational framework for the management of the sports activity in our country was ensured by the Federation of Sports Societies of Romania (hereinafter FSSR), established on 1 December 1912, an organization representing the private initiative (private). With the implementation of this law, the FSSR will work in parallel with the ONEF, both organizational structures carrying out their activities independently, independent of each other.

2. *The Law of Physical Education of September 4, 1929* (Official Gazette, 1929). Compared to the Law of 1923, the main changes were: physical education was a general obligation for all the youth of the country and was carried out in an organized framework - state, private and special school institutions; reorganization of ONEF; encouraging private (private) initiative to play a role in the development of sports through the pooling of amateur associations and professionals in federations. Through the implementation of the new law, physical education and sport will benefit from a new vision of the importance of this area of activity owing in particular to public-private partnerships, with the State providing subsidies, tax incentives and the provision of ONEF land.

3. *The Modifying Act of Physical Education Law of 5 August 1929*, adopted on 8 May 1933 (Official Gazette, 1933). The promulgation of the law was based on the fact that the private (private) sports movement had reached a different level of development compared with previous years, and the governors wished to provide a suitable legislative framework in this respect. Consequently, the FSSR was replaced by the Union of Sports Federations of Romania (hereinafter UFSR) and the State provided the new organization with the legitimacy to exercise its right of guidance, coordination and control over the administrative, financial and technical activity of the specialized federations, as well as all associations of sports, tourism and physical education from a private initiative. At the same time, the State provided UFSR with facilities in favor of the development of the national sports movement, providing: subsidies; awards, aids; land for sports activities; the issuance of collective passports for teams traveling abroad to participate in sports events; exemption from taxes on shows and sporting events organized by amateurs within UFSR; a 50% reduction in travel rates (railways and sea routes) for UFSR-affiliated sports groups.

B. The organizational framework, represented by the national federations on the sport branch

On 1 December 1918, in Romania, the sport movement took place under the auspices of the FSSR, an organization that had in its organizational chart a number of 10 special sports commissions, namely: athletics; rowing; cycling; football; swimming; tennis; rugby; fencing; winter sports; shooting.

At the end of the interwar period, UFSR, an organization that took over all the rights and obligations of the FSSR, starting with the implementation of the 1933 Law, had 22 organizational bodies in its organizational structures: Athletics; basketball and volleyball; bob and slide; box; cycling; equestrian; football; gymnastics; handball; Ice Hockey; swimming; fights and weightlifting; motorcycle; ice skating; bowling; rugby; fencing; skiing; water sports; tennis; table tennis; (Encyclopedia of Physical Education and Sport in Romania, 2002, vol. III).

C. Participation of Romanian athletes and achievements at the world's largest sports event - Summer Olympics

In the interwar period, the Romanian athletes participated in three editions of the Summer Olympics held in 1924 in Paris, 1928 in Amsterdam and 1936 in Berlin.

In Paris in 1924, Romania participated with 51 athletes, 4 sports - football, rugby, tennis and shooting, winning the first Olympic medal - bronze, through the rugby team.

In Amsterdam in 1928, Romania participated with 26 athletes, 2 sports - athletics and fencing, without any medals.

In Berlin, in 1936, Romania participated with 71 athletes in 8 sports - athletics, boxing, horseback riding, gymnastics, shooting, fights, scribes and handball, with a silver medal at horseback riding (Encyclopedia of Physical Education and Sport from Romania, 2002, vol. II, www.cosr.ro).

II. Communist Period (1947 - 1989)

A. Legislative framework, represented by laws specific to physical education and sport

In the context of the new socio-economic and political realities in Romania, the aim was to change the orientation of the field of physical education and sport, in fact a reconsideration of the means used and a new form of organization in relation to the interwar period. An essential reference in this respect was the promulgation on December 28, 1967, of the law on the development of the activity of physical education and sport (Official Bulletin of the Socialist Republic of Romania, 1967). Compared to the laws of the interwar period (promulgated in 1923, 1929 and 1933), 1967 is detached by the complexity of its content, by the multitude of fundamental objectives and tasks in the development of the field of activity, and perhaps the most important element, through its central structures, and the provision of adequate funding and infrastructure.

By the form, content and effects of the 1967 Act, the governors of the communist period demonstrated that physical education and sport were activities of national interest. As a result, until the end of the communist period (December 1989), the field of activity finalized an appropriate and complex structure, highlighting the development of mass sports in villages, enterprises, schools and faculties; the formation of excellent specialists - teachers, coaches, doctors, highlighting the quality of their training; providing an optimal infrastructure for carrying out specific activities; the participation and the results achieved by the Romanian athletes at the main world events - the Summer Olympics, the World Championships, the European Championships, placed Romania among the top 10 nations of the world.

B. The organizational framework, represented by the national federations on the sport branch

During the communist period, the organizational framework of the field of activity was represented by the following central management structures: the People's Sport Organization (1944-1949); Committee on Physical Culture and Sports (1957-1967); National Council for Physical Education and Sport (1967-1989). Throughout this time, the National Sport Federations, considered as sporting bodies with legal personality, with their own statutes and budgets (subsidies received from the State through the tutorship institutions) with attributions in: development of sports branches; organizing the competitive system; selection and training of national sports teams; training coaches; the representation of the country in the international bodies for the respective sport, etc. Also, the number of federations increased relative to the interwar period, reaching the end of communist governance in 32 such structures: athletics, automobile and carting; aviation, basketball, boxing, horse riding - modern pentathlon, canoeing - yachting, cycling, football, gymnastics, weightlifting, handball, hockey, judo, kayak - canoe, fights, modelism, moto, , ski - bob, fencing, chess, tennis, table tennis, shooting, tourism - orientation - mountaineering - volleyball (Encyclopedia of Physical Education and Sport of Romania, 2002, vol.

C. Participation of Romanian athletes and achievements at the world's largest sports event - Summer Olympics

In 1952, Romania participated with 128 athletes in 15 sports: athletics, basketball, boxing, canoeing, horseback riding, cycling, football, artistic gymnastics, weightlifting, swimming, kayaking, shooting. Four medals have been won, of which: 1 gold - shooting; 1 silver-box; 2 bronze - boxing and shooting.

At Melbourne in 1956, Romania participated with 52 athletes in 11 sports: athletics, boxing, horseback riding, artistic gymnastics, swimming, kayaking, canoeing, fights, pentathlon, polo, fencing, shooting. 13 medals have been won, including: 5 gold - 1 box, 3 kayak-canoe, 1 shooting; 3 silver - 2 box, 1 fencing; 5 bronze - 1 box, 2 artistic gymnastics, 1 wrestling and 1 shooting.

In Rome in 1960, Romania participated with 109 athletes in 13 sports: athletics, boxing, canoeing, horseback

riding, cycling, artistic gymnastics, weightlifting, swimming, kayaking, canoe, fights, polo, fencing, shooting. 10 medals have been won, including: 3 gold - 1 athletics, 1 wrestling, 1 shooting; 1 silver - fights; 6 bronze - 1 athletics, 1 box, 1 artistic gymnastics, 1 kayak - canoe, 1 wrestling, 1 fencing.

In Tokyo, in 1964, Romania participated with 147 athletes in 13 sports: athletics, boxing, canoeing, cycling, football, artistic gymnastics, weightlifting, kayaking, canoe, fights, polo, fencing, shooting, volleyball. There were won 12 medals, of which: 2 gold - athletics; 4 silver - 2 kayak - canoe, 1 fight, 1 shooting; 6 bronze - 1 athletics, 4 kayak - canoe, 2 fights.

In Mexico City, in 1968, Romania participated with 87 athletes in 9 sports: athletics, boxing, canoeing, cycling, swimming, kayaking, canoe, fights, fencing, shooting. 15 medals have been won, including: 4 gold - 2 athletics, 1 kayak - canoe, 1 fencing; 6 silver - 2 athletics, 1 box, 1 kayak - canoe, 1 wrestling, 1 shooting; 5 bronze - 1 box, 1 kayak - canoe, 2 fights, 1 fencing.

In 1972, Romania participated with 169 athletes in 16 sports: athletics, boxing, canoeing, cycling, artistic gymnastics, weightlifting, handball, swimming, kayaking, canoe, fights, pentathlon, polo, fencing, jumping in water, shooting, volleyball. 16 medals were won, of which: 3 gold - 1 kayak - canoe, 2 fights; 6 silver - 2 athletics, 1 box, 2 kayak - canoe, 1 tire; 7 bronze - 1 canoeing, 1 handball, 1 kayak - canoe, 2 fights, 1 sheet, 1 shooting.

At Montreal, in 1976, Romania participated with 166 athletes in 11 sports: athletics, boxing, canoeing, artistic gymnastics, weightlifting, handball, kayaking, canoe, fights, polo, fencing, shooting. 27 medals were won, of which: 4 gold - 3 artistic gymnastics, 1 canoe - canoe; 9 silver - 2 boxes, 2 artistic gymnastics, 1 handball, 1 kayak - canoe, 3 fights; 14 bronze - 1 athletics, 3 boxing, 1 canoeing, 3 artistic gymnastics, 2 canoeing, 3 wrestling, 1 fencing.

In Romania in 1980, Romania participated with 239 athletes in 20 sports: athletics, boxing, canoeing, horseback riding, cycling, artistic gymnastics, weightlifting, handball, swimming, judo, kayaking, jumping in water, fencing, shooting, archery, volleyball, yachting. 25 medals have been won, including: 6 gold - 1 canoeing, 2 artistic gymnastics, 1 kayak - canoe, 1 wrestling, 1 shooting; 6 silver - 3 artistic gymnastics, 2 canoe - 1 canoe, 1 wrestling; 13 bronze - 2 boxing, 2 canoeing, 1 horse riding, 2 artistic gymnastics, 1 handball, 2 canoeing, 2 wrestling, 1 volleyball.

In Los Angeles, in 1984, Romania participated with 127 athletes in 13 sports: athletics, boxing, canoeing, artistic gymnastics, rhythmic gymnastics, weightlifting, handball, swimming, judo, kayak, canoe, fights, fencing, shooting. There have been won 53 medals, of which: 20 gold - 3 athletics, 6 canoeing, 5 artistic gymnastics, 2 weightlifting, 2 canoeing, 2 wrestling; 16 silver - 3 athletics, 2 canoeing, 1 artistic gymnastics, 1 rhythmic gymnastics, 5 weightlifts, 1 kayak - 1 canoe, 1 fight, 1 fencing, 1 shooting; 17 bronze - 4 athletics, 1 box, 2 artistic gymnastics, 1 weightlifting, 1 handball, 2 judo, 1 kayak - canoe, 3 fights, 1 swimming, 1 fencing.

In 1988, Romania participated with 62 athletes in 10 sports: athletics, boxing, canoeing, artistic gymnastics, weightlifting, swimming, kayaking, canoe, fights, fencing, shooting. 24 medals have been won, including: 7 gold - 1 athletics, 1 canoeing, 3 artistic gymnastics, 1 wrestling, 1 shooting; 11 silver - 1 athletics, 1 box, 4 canoeing, 3 artistic gymnastics, 1 weightlifting, 1 swimming; 6 bronze - 2 canoeing, 3 artistic gymnastics, 1 swimming (Encyclopedia of Physical Education and Sport in Romania, 2002, vol. II, www.cosr.ro).

III. Post-December period (1989-2018)

A. Legislative framework, represented by laws specific to physical education and sport

The events that occurred in December 1989, which changed the nature of the country's government from a totalitarian regime to a democratic one, disoriented the Romanian society in the search for its new identity. The inconsistencies specific to the transition period, extended so far, to alternations in the government of the country, to the continuing diminishing of financial resources, were the reasons why the field of physical education and sports did not benefit from a proper path that would put it on a normal path, which represents a regression from the previous interval. A contribution in this respect has been and still has the effect of the Physical Education and Sports Law no. 69 of 2000 and its sequential modifications that make it necessary to change especially from the point of view of organizing the activity of physical education and sports in accordance with the current internal and international requirements.

The promulgation of Law no.69 / 2000 with subsequent amendments and completions (www.fro.ro) aims to improve the legislative and organizational framework regarding the development of the field of physical education and sport at national level and to ensure a favorable climate of training and representation of Romanian athletes at major international events - Olympic Games, World Championships, European Championships, etc. However, given the evolution of performance sports since the implementation of the Law to date, there is a real regression both from the point of view of Romania's representation at the most important world event - the Summer Olympic Games, and from the perspective of achieving notable performances at these Olympic competitions. From our perspective, the causes are multiple, but the most important is the functionality of the National Sports Federations, namely: these

structures are no longer found in the organizational chart of the Ministry of Youth and Sports (hereinafter MTS), in the past being subordinated of this governing body of the sports movement in our country, which in particular generates insufficient and inefficient financing; all these structures are of public utility and national interest, but the value, scale and importance of these sporting structures differ greatly, especially from an organizational point of view (for example, the Romanian Gymnastics Federation with the Romanian Table Federation, etc.); all these structures have the same legal status, the same rights and obligations, whether the Federation represents an Olympic or a non-Olympic sport, characteristics that show us that there is no differentiation between these structures as logically and necessarily should happen, if we relate to the international model, where the established and traditionally sports have a wide spread, being recognized by the International Olympic Committee.

B. The organizational framework, represented by the national federations on the sport branch

At the end of the communist era, the Romanian sports movement was headed by the CNEFS and had in its organizational chart a number of 32 National Sports Federations.

In organizational terms, the CNEFS will be replaced in the first instance with the Ministry of Sport with the implementation of the Decision no. 549 of February 16, 1990, which will lead in time to a continuous reorganization of the Romanian sports movement with negative consequences especially from the point of view of the value of the performances obtained at international level.

At present, MTS represents the specialized body of the central public administration with legal personality, which is subordinated to the Romanian Government and coordinates the activity in the field of physical education and sport. Among its attributions to the National Sports Federations are among others the fact that: represents the interests of the State in relation to the specialized federations (Article 18, point 1, paragraph a of Law 69/2000 on Physical Education and Sport); provides financial support to specialized federations based on contracts for the financing of their sports programs (Article 18, paragraph 1, paragraph of Law 69/2000 on Physical Education and Sport); authorizes the affiliation of national sports federations to international sports federations and other continental or world forums (Article 18 (1) (j) of Law 69/2000 on physical education and sport) (www.fro.ro)

Looking at the whole, we find that despite the many financial difficulties and the precarious infrastructure, the Romanian sports activity continued to develop, with new sports and, implicitly, a record number of federations compared to the other periods. As a result, at present, in Romania, a number of 74 National Sports Federations are recognized by MTS: aeronautics, aikido, mountaineering and escalade, martial arts, martial arts, athletics, sports cars, badminton, billiard pool, basketball, baseball and softball, bob sled, boxing, bridge, canoeing, cycling, bodybuilding and fitness, sporting diving, darts, sports, equestrian, soccer, football, tennis, gymnastics, rhythmic gymnastics, go, golf, weightlifting, handball, hockey on ice, hockey on grass, judo, karting, kaiac-canoe, karate kyokushiniko 2, karate, karate traditional, karate wukf, kempo, wrestling, modelism, motorcycle, modern swimming and pentathlon, oine, orientation, sport fishing, skating, polo, poppy, power lifting, radio-amateur, rugby, biathlon, scrabble, fencing, sambo, snooker, paralympic national committee, sport for all, chess, table / backgammon, taekwondowtf, taekwandoitf, tennis, table tennis, sports, shooting with arc, triathlon, volleyball, vovinam viet-vo-dao, yachting, squash, cricket, chambara. (Www.mts.ro)

This increase in the number of federations, all of which have the same status, the same rights and obligations, according to the text of Law 69/2000 has less effect, especially in view of the Olympic performances and the potential of representation of our country by the number ever smaller than qualified Olympic athletes.

C. Participation of Romanian athletes and achievements at the world's largest sports event - Summer Olympics

In Barcelona, in 1992, Romania participated with 179 athletes in 18 sports: athletics, badminton, boxing, canoeing, artistic gymnastics, rhythmic gymnastics, weightlifting, handball, judo, kayaking, jumping in the water, fencing, tennis, table tennis, shooting. 18 medals were won, of which: 4 gold - 2 canoeing, 2 artistic gymnastics; 6 silver - 1 athletics, 4 canoeing, 1 artistic gymnastics; 8 bronze - 1 box, 1 canoeing, 2 artistic gymnastics, 1 weightlifting, 1 fight, 1 fencing, 1 shooting.

In Atlanta, in 1996, Romania participated with 168 athletes in 18 sports: athletics, boxing, canoeing, artistic gymnastics, rhythmic gymnastics, weightlifting, swimming, judo, kayak - canoe, fights, modern pentathlon, polo, jumping in water, fencing, field tennis, table tennis, shooting, yachting. 20 medals were won, of which: 4 gold - 2 canoeing, 1 artistic gymnastics, 1 fencing; 7 silver - 1 athletics, 4 artistic gymnastics, 1 kayak - canoe, 1 fencing; 9 bronze - 2 boxing, 5 artistic gymnastics, 1 weightlifting, 1 canoeing - canoe.

In Sydney, in 2000, Romania participated with 156 athletes in 16 sports: athletics, boxing, canoeing, artistic gymnastics, weightlifting, handball, swimming, judo, kayak, canoe, fights, modern pentathlon, water jumping, fencing, tennis, table tennis, shooting. 26 medals have been won, including: 11 gold - 1 athletics, 3 canoeing, 3 artistic

gymnastics, 1 canoeing, 2 swimming, 1 fencing; 6 silver - 2 athletics, 1 box, 2 artistic gymnastics, 1 swimming; 9 bronze - 2 athletics, 1 box, 1 artistic gymnastics, 1 judo, 2 canoeing, 1 swimming, 1 shooting.

In Athens, in 2004, Romania participated with 108 athletes at 16 sports: athletics, boxing, canoeing, horseback riding, cycling, artistic gymnastics, weightlifting, judo, kayak, canoe, fights, swimming, water jumping, fencing, tennis field, table tennis, shooting. 19 medals were won, of which: 8 gold - 3 canoeing, 4 artistic gymnastics, 1 swimming; 5 silver - 2 athletics, 3 artistic gymnastics; 6 bronze - 1 athletics, 1 box, 3 artistic gymnastics, 1 swimming.

In 2008, Romania participated with 102 athletes in 14 sports: athletics, boxing, canoeing, artistic gymnastics, weightlifting, handball, judo, kayak, canoe, fights, swimming, fencing, table tennis, shooting, shooting with the bow. 9 medals have been won, including: 4 gold - 1 athletics, 1 canoeing, 1 artistic gymnastics, 1 judo; 1 silver - fencing; 4 bronze - 1 canoeing, 1 artistic gymnastics, 1 wrestling, 1 fencing.

In London, in 2012, Romania participated with 105 athletes in 15 sports: athletics, boxing, canoeing, cycling, artistic gymnastics, weightlifting, judo, kayaking, canoe, fights, swimming, water polo, fencing, tennis, table tennis, shooting. 9 medals were won, of which: 2 gold - 1 artistic gymnastics, 1 shooting; 5 silver - 1 artistic gymnastics, 1 weightlifting, 2 judo, 1 fencing; 2 bronze - 1 artistic gymnastics, 1 weightlifting.

At Rio de Janeiro in 2016, Romania participated with 96 athletes in 15 sports: athletics, boxing, canoeing, cycling, artistic gymnastics, rhythmic gymnastics, weightlifting, handball, judo, fights, swimming, fencing, tennis, table tennis, shooting. Four medals were won, of which: 1 gold - fencing; 1 silver - field tennis; 2 bronze - 1 canoeing, 1 wrestling (Encyclopedia of Physical Education and Sport of Romania, 2002, vol. II, www.cosr.ro).

Results

A) Legislative framework, represented by laws specific to physical education and sport

In the analyzed period (1918-2018), 5 laws of physical education and sport were promulgated, 3 in the interwar period, 1 in the communist period and 1 in the post-December period (Figure 1).

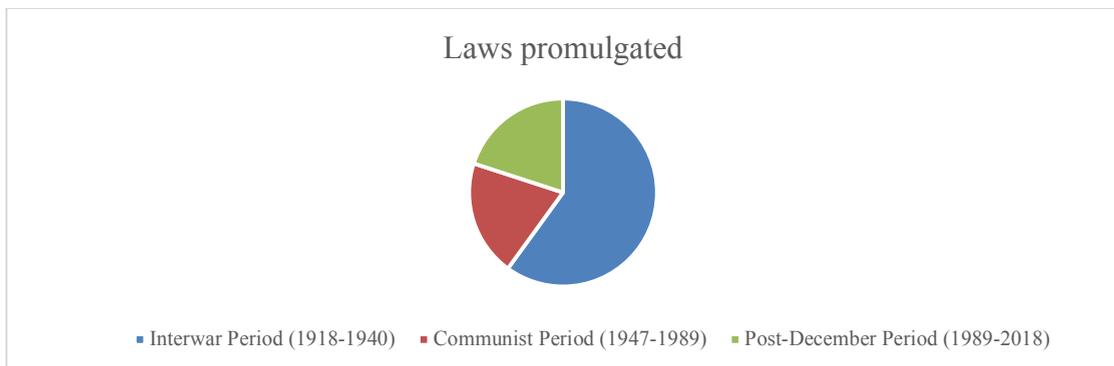


Figure no. 1 Laws promulgated

B) The organizational framework, represented by the national federations on the sport branch

During the inter-war period, 22 national sports federations were active; in the communist period, 32 national sports federations have been operating; in the post-December period there were 74 national sports federations (Figure 2).

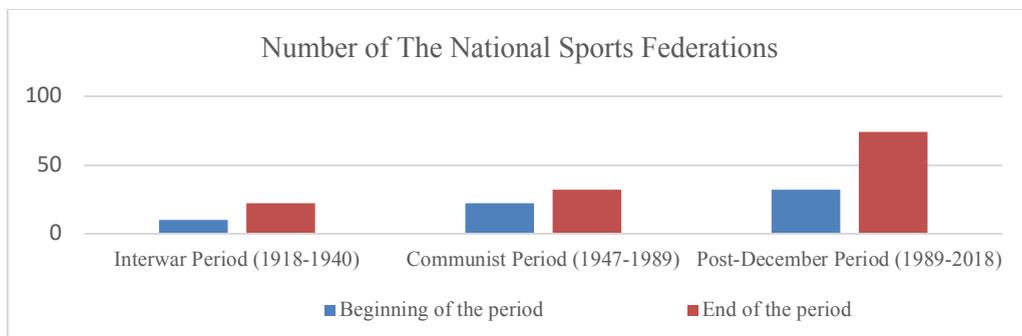


Figure no. 2 Number of the National Sports Federations

C) Participation of Romanian athletes and achievements at the world's largest sports event - Summer Olympics

a. Participation of Romanian athletes at the Summer Olympics (Figure 3)

In the interwar period, Romania participated in three editions, out of a total of 5, which took place between 1920-1936, missing from Antwerp (1920) and Los Angeles (1932). There were 148 athletes at 11 sports, with 2 medals won.

During the communist period Romania participated in 10 editions, out of a total of 11, which took place between 1948-1988, missing from London (1948). There were 1286 athletes at 23 sports, with 200 medals won.

In the post-December period, Romania participated in all 7 editions held since 1992 and by 2016. There were 914 athletes in 22 sports and 105 medals were won.

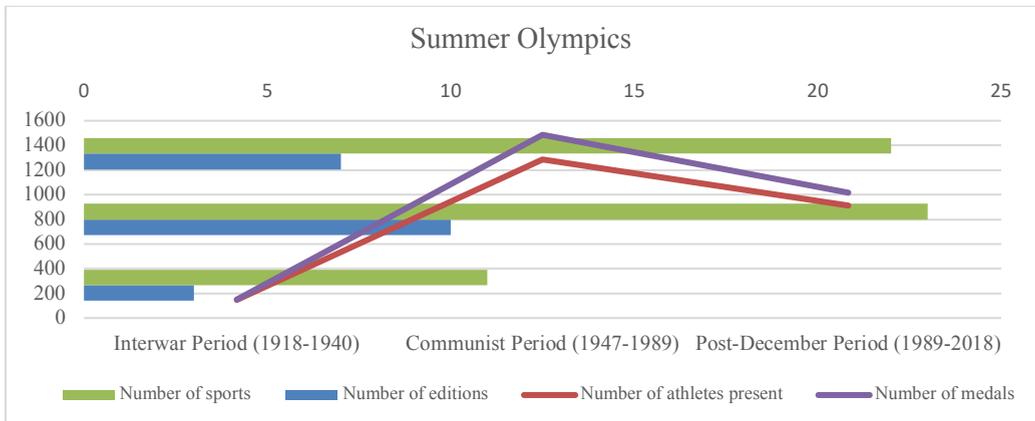


Figure no. 3 Summer Olympics

b. Performance achieved by Romanian athletes at the Summer Olympics

During the interwar period, the three Romanian athletes won two medals: 1 silver (riding) and 1 bronze (rugby).

During the communist period, the 10 Romanian editions won 200 medals: 55 gold, 63 silver and 82 bronze (Figure 4).

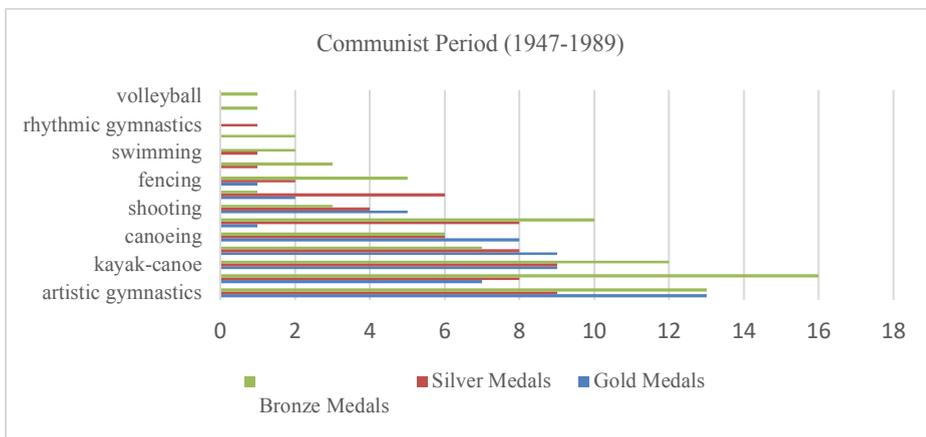


Figure no. 4 Communist Period

In the post-December period, for the 7 editions, the Romanian athletes won 105 medals: 34 gold, 31 silver and 40 bronze (Figure 5).

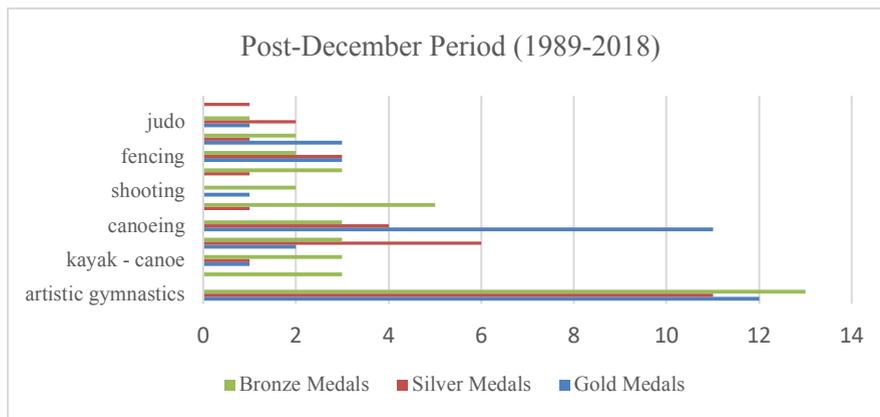


Figure no. 5 Post-December Period

Discussions

A) Legislative framework, represented by laws specific to physical education and sport

Of the five laws promulgated over the course of the 100 years, only three of them - 1933, 1967 and 2000 - were highlighted by their form, content and effects. The 1933 law has practically opened the way for the development of the Romanian sports movement, both at the national level through the increase of the number of National Sports Federations, as well as at international level through a better representation at major international events. The 1967 law created a new dimension of the field of activity, expanding considerably the means of propagating sports activities in all social segments. Performance sport has been the exponential vector in representing Romania at international events, especially at the Summer Olympics. The 2000 Law established that physical education and sports activities are of national interest, but the evolution of performance sports shows a fairly visible regression in the representation of Romania at international level and especially in the Summer Olympic Games .

B) The organizational framework, represented by the national federations on the sport branch

The number of National Sport Federations increased in each analyzed time frame: in the interwar period, from 10 to 22; in the communist period, from 22 to 32; in the post-December period, from 32 to 74. The increase in the number of federations certifies that the Romanian sports movement has evolved, especially in the post-December period, but in qualitative terms, Romania's visibility at the Summer Olympics , by the number of participating athletes and medals won, is steadily decreasing (see editions 2008, 2012, 2016).

C) Participation of Romanian athletes and achievements at the world's largest sports event - Summer Olympics

During the 100 years of Romanian sports movement, Romania was present at 20 Summer Olympics, out of a total of 23, missing in the 1920, 1932 (1918) and 1948 (Communist period) financial reasons. There were 2348 athletes: 148 for the interwar period; 1286 for the Communist period; 914 for the post-December period. 307 medals were won at 17 sports: 2 medals for the interwar period (1 silver, 1 bronze); 200 medals for the communist period (55 gold, 63 silver, 82 bronze); 105 medals for the post-December period (34 gold, 31 silver, 40 bronze). Concerning the distribution of medals on sports, we have the following: artistic gymnastics - 71 medals (25 gold, 20 silver, 26 bronze); canoeing - 38 medals (19 gold, 10 silver, 9 bronze); athletics - 35 medals (11 gold, 14 silver, 10 bronze); kaiac-canoe - 35 medals (10 gold, 10 silver, 15 bronze); fights - 34 medals (7 gold, 8 silver, 19 bronze); box - 25 medals (1 gold, 9 silver, 15 bronze); fencing - 16 medals (4 gold, 5 silver, 7 bronze); shooting - 15 medals (6 gold, 4 silver, 5 bronze); weightlifting - 13 medals (2 gold, 7 silver, 4 bronze); swimming - 9 medals (3 gold, 2 silver, 4 bronze); judo - 6 medals (1 gold, 2 silver, 3 bronze); handball - 4 medals (1 silver, 3 bronze); horse riding - 2 medals (1 silver, 1 bronze); rhythmic gymnastics - 1 medal (silver); tennis - 1 medal (silver); rugby - 1 medal (bronze); volleyball - 1 medal (bronze).

For the interwar period, Romania participated in 11 Olympic disciplines - athletics, boxing, horseback riding, football, gymnastics, handball, fights, rugby, fencing, tennis, shooting, and two medals in two sports: bronze (rugby).

For the communist period, Romania had participants in 23 Olympic disciplines - athletics, basketball, boxing, canoeing, horseback riding, cycling, football, artistic gymnastics, rhythmic gymnastics, weightlifting, handball, swimming, jumping, water jumping, fencing, shooting, archery, volleyball, yachting, and have won 200 medals at 15 sports: artistic gymnastics, 35 medals (13 gold, 9 silver, 13 bronze) medals (7 gold, 8 silver, 16 bronze), kaiac-canoe,

30 medals (9 gold, 9 silver, 12 bronze), athletics, 24 medals (9 gold, 8 silver, 7 bronze) (5 gold, 4 silver, 3 bronze), weightlifting, 9 medals (2 gold, 6 silver, 6 bronze), boxing, 19 medals (1 gold, 8 silver, 6 bronze, 1 bronze), fencing, 8 medals (1 gold, 2 silver, 5 bronze), handball, 4 medals (1 silver, 3 bronze), swimming, 3 medals (1 silver, 2 bronze) (bronze), rhythmic gymnastics, 1 medal (silver), horseback riding, 1 medal (bronze), volleyball, 1 medal (bronze).

For the post-December period, Romania participated in 23 Olympic disciplines - athletics, badminton, boxing, canoeing, horseback riding, cycling, artistic gymnastics, rhythmic gymnastics, weightlifting, handball, swimming, judo, kayaking, , polo, water jumping, fencing, field tennis, table tennis, shooting, archery, yachting, and have won 105 medals at 12 sports: artistic gymnastics, 36 medals (12 gold, 11 silver, 13 bronze), canoeing, 18 medals (11 gold, 4 silver, 3 bronze), athletics, 11 medals (2 gold, 6 silver, 3 bronze), fencing, 8 medals (3 gold, 3 silver, 2 bronze) medals (3 gold, 1 silver, 2 bronze), boxing, 6 medals (1 silver, 5 bronze), kаяac canoe, 5 medals (1 gold, 1 silver, 3 bronze), judo, 4 medals silver, 1 bronze), weightlifting, 4 medals (1 silver, 3 bronze), shooting, 3 medals (1 gold, 2 bronze), wrestling, 3 medals (bronze), field tennis, 1 medal (silver).

Conclusions

After analyzing and interpreting the data presented, we find that in the mentioned period, 1918-2018, the specific legislation in the field was extremely diverse, especially from the perspective of political and economic factors, where the role of the governors was more or less decisive in the development physical education and sport in relation to the transformations of the Romanian society.

From the point of view of Romania's representation at the Summer Olympic Games, the communist period has a special significance through its performances compared to the other periods, both by the number of athletes present (1286 to 23 Olympic disciplines) and by the achieved performances (200 medals at 15 sports), highlighting the fact that the governors, through the implemented measures, provided a well-established legislative and organizational framework in which physical education and sport were truly activities of national interest.

By the content and the layout of the presented information, we aimed to appreciate in a realistic way the efficiency of some documents adopted in different periods - interwar, communist and post-December, with major implications in the evolution and development of the Romanian sports movement having as reference: legislation provided by laws specific to the field of activity; the organizational framework represented by the specialized federations; the participation of Romanian athletes and the performances at the Summer Olympics.

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Study on Physical Condition Level of Physical Education Teachers in Constanta County

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Abstract

The present study was conducted during the school year 2017-2018, the subjects were selected from all areas of the county, both from rural and urban areas, as well as from general and high schools. Worldwide, at least 2.8 million people die each year as a result of being overweight or obese. The example of the teaching staff with specialization in physical education is particularly important for the future of the children with whom they work. The physical form and capacity to support, by its own example, the theoretical information it transmits to young people directly influences the students' actions as well as the understanding of the importance of exercising as a means of achieving any proposed goal. Applying the questionnaire aimed at assessing personal physical activity on three distinct dimensions. The purpose of this paper was to evaluate the physical condition of the specialty teachers in the pre-university education system and to develop some remedial measures in order to optimize the didactic process within the physical education lesson. In all WHO regions women were more likely to be obese than men. In the WHO regions for Africa, Eastern Mediterranean and South East Asia, women had roughly double the obesity prevalence of men. The Body Mass Index (BMI) test showed an average percentage of men around 23% and 23.2% for women aged 25-35 years and 26% for men and 25.3% for women for the age group 35-50 years. The national average in Romania is 24.2% compared to the Republic of Moldova where the percentage is 24.6%, Ukraine 24.9%, Bulgaria 25.7%, Hungary 25.5%. The biggest differences between men and women are recorded in Jamaica where men have 24.8% compared to women 29.9%. The research hypothesis has been verified and confirmed, so that the application of training and nutrition programs tailored to the conditions and needs of the physical and sport education teachers in Constanta County have led to an optimal physical form appropriate to the socioprofessional context in which they work.

Keywords: education, own example, body mass index

Introduction

The science of physical education and sport (upper notion - science) - represents all the knowledge about physical exercise, correlated in a system of notions and presented in one of its own theories, which establishes the principles according to which biological effects are predicted, valorized and confirmed spiritual in the practice of social life. The science of physical education and sport through the profile of its biological and pedagogical knowledge has a synthesis character. The object of knowledge is man in his process of social integration and with the help of practicing physical exercises, in order to improve his organic and psychic and, implicitly, to increase his social performance (Alexe, N 1974).

Even though in our country uses the term "science of physical education and sport", in almost throughout Europe, the term has been replaced with the phrase "Sports Science" = Sport Science - to define this field of activity.

The science of Sport has long been in pedagogy or medicine as a branch of science, and today we use methods, techniques, hypotheses and other sciences such as biology, psychology, anthropology, sociology (Epuran, M.) that this field of activity has become an interdisciplinary science.

Values that advance physical education and sport to science can be physical, intellectual, moral, or spiritual. With these activities contribute to increasing the vital tone of the individual or group, the closer will be to the culture and the concept of sport science.

In Parsons' conception, the cultural system is linked to the social system through institutional relations, and the system of human personality internalizes it in social reality (Biriş I., 2000). In postmodern society and where

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globalization imposes certain social realities, society and culture are defined in a correlative way, "everyone and every participant in social life being a cultural product." (Achim Mihi, 1996).

Physical culture synthesizes all the values meant to exploit the physical exercise in order to improve the biological, spiritual and motor potential of man (Cârstea, 1999). The syntax of culture is successfully replaced with the phrase Science of Sport, thanks to the numerous valuable research undertaken worldwide in our field of activity.

Factors Affecting Weight & Health. Many factors can affect your weight and lead to overweight or obesity. Some of these factors may make it hard for you to lose weight or avoid regaining weight that you've lost.

Family history and genes. Overweight and obesity tend to run in families, suggesting that genes may play a role. Your chances of being overweight are greater if one or both of your parents are overweight or have obesity. Your genes may affect the amount of fat you store in your body and where on your body you carry the extra fat.

Race or ethnicity. Some racial and ethnic minority groups are more likely to have obesity. Obesity rates in American adults are highest in African Americans, followed by Hispanics/Latinos, then Caucasians. This is true for men and women.⁴ While Asian American men and women have the lowest rates of obesity,⁴ they can still be at risk of diseases associated with obesity if they carry a lot of unhealthy fat in their abdomen—even when their body mass index (BMI) is lower (Flegal KM, Kruszon-Moran D2005).

Age. Many people gain weight as they age. Adults who have a normal BMI often start to gain weight in young adulthood and continue to gain weight until they are ages 60 to 65. In addition, children who have obesity are more likely to have obesity as adults.

Sex. In the United States, obesity is more common in black or Hispanic women than in black or Hispanic men.⁴ A person's sex may also affect where the body stores fat. Women tend to build up fat in their hips and buttocks. Men usually build up fat in their abdomen or belly. Extra fat, particularly if it is around the abdomen, may put people at risk of health problems even if they have a normal weight.

Eating and physical activity habits. Your eating and physical activity habits may raise your chances of becoming overweight and having obesity if you

- eat and drink a lot of foods and beverages that are high in calories, sugar, and fat
- drink a lot of beverages that are high in added sugars
- spend a lot of time sitting or lying down and have limited physical activity

Where you live, work, play, and worship. Where you live, work, play, and worship may affect your eating and physical activity habits, and access to healthy foods and places to be active.

For example, living in an area that has a high number of grocery stores can increase your access to better quality, lower calorie foods. Living in a neighborhood with a lot of green spaces and areas for safe physical activity may encourage you to be more physically active.

Where you work and worship may also make it easier for you to eat unhealthy, high-calorie foods. Vending machines, cafeterias, or special events at your workplace or place of worship may not offer healthy, lower calorie options. Whenever possible, choose the healthier options and limit your treats to a small sliver of pie or cake.

Family habits and culture. Family eating and lifestyle habits may affect your weight and health. Some families may consume foods and beverages that are high in fat, salt, and added sugars or eat large amounts of unhealthy foods at family gatherings. Some families may also spend a lot of inactive time watching TV, using a computer, or using a mobile device instead of being active.

Your social, ethnic, or religious group culture may also affect your weight and health because of shared eating and lifestyle habits. Some cultures may consume foods and beverages that are high in fat, salt, and added sugars. Some common food preparation methods, such as frying, may lead to high-calorie intake. Regularly consuming foods high in calories, fat, and sugar may lead to weight gain overtime.

Not enough sleep. People who don't get enough sleep may eat more calories and snack more.⁶ Experts recommend that adults ages 18 to 64 get 7 to 9 hours of sleep a day, and that adults ages 65 and older get 7 to 8 hours of sleep a day.⁷

Other factors. Other factors that can lead to weight gain include

- certain medical conditions
- certain medicines
- binge eating disorder
- stress

Many factors can make it hard to lose weight, including

- your genes
- what and how much you eat
- not getting regular physical activity or being inactive

- taking certain medicines
- having certain medical conditions
- Difficulty in managing stress

In the physical education lesson, when one or more values are appropriated, becoming convictions, they particularly structure the student's behavior, child's behavior and constitute an authentic leader of the actions and the way they are (Abalasei, B. Iacob, R Puni, R .2017). Understanding the role of the demonstration in the learning teaching process, we consider it opportune to intervene to improve the physical condition of physical education teachers in schools so that they can safely demonstrate and doing a correct demonstration can help guide student observation to perceive the essential elements of motor actions, which can stimulate students' desire for practice and for success. The use of a certain type of demonstration will take into account the individual particularities of the subjects. When typical mistakes (present in a larger number of students) are found, an extra demonstration may be carried out to highlight the essential aspects, but also to a wrong demonstration in order to highlight the mistakes in execution or misunderstanding of movements. Demonstration efficiency increases when accompanied by an explanation that emphasizes certain aspects. Demonstration and verbal exposure (explanation, conversation) are the basic methods used to form a perception, a clear representation of the movement to be performed.

The aim of the paper is to improve the physical condition of physical education teachers in Constanța in order to optimize the physical education lesson.

The amount of information perceived by the visual analyzer is 80% of all information about the external environment, which is why the visual analyzer's role in learning is unequal. Learning or acquiring knowledge is a cognitive process that becomes more difficult, with a poor visual perception. For a correct demonstration, the physical education teacher must have permanent control of balance. For this, the projection of the center of gravity must be permanently projected into the support base. The backbone can be represented by the points through which the segments of the human body come into contact with the ground. In many situations, the support base may be reduced. (Cordun, M. 1999)

The situation in which the teacher's body weight includes an increased body mass index can induce a state of imbalance and uncertainty at the time of the demonstration, producing both confusion and eventual inappropriate exposure of a teacher in the presence of students. The vast majority of students, over 65%, have a tendency to learn visually. There are a large number of researchers who support this. When it is accompanied by visual clues, information becomes much easier to memorize and recover. Essentially, the human brain is primarily a processor for images. The part of our brain that processes verbal information is quite small compared to the one that manipulates the images.

In all classrooms, students have to read, write, listen and communicate. Physical education is no exception (Lapp, Fisher, & Flood, 1999). The development of communicational and visual arts is important for general student education and can improve the skills of thinking, creativity and problem solving (Richardson, Sacks, & Ayers, 2003). Reading, writing and speaking are all embedded in the visual arts. By including visual arts in class, teachers can motivate students to become more involved in communication (Lin, 2003). Most students are visual learners and therefore the use of visual representation is an effective way to help the learner learn (Gil-Garcia & Villegas, 2003).

Promoting a healthy lifestyle by reducing sedentary behavior due to excessive use of the internet or audiovisual media as well as increasing physical activity is indispensable. School and family can play a decisive role in promoting an active and healthy lifestyle. (Damian, M., Oltean, A., Damian, C., 2018)

In the physical education room there are many opportunities to use visual representations to improve the learning process. Because physical education uses motion and learning skills that require body movement in different ways, visual examples play a very important role. The use of manipulative materials is common in physical education, giving students visual and physical references (Siverman, 1995).

Traditionally, many physical education teachers are based on demonstrations to teach the content of school curricula in a correct manner.

Methods and materials

The research was conducted in December (2017) - May (2018). The research started and ended with the application of the Becke questionnaire to 30 teachers from urban and rural areas. At the same time, operational systems were proposed in the form of fitness exercises tailored to the individual needs of teachers. The training period was 14 weeks 3 times a week. The exercises were delivered online and each teacher kept a diary in which he recorded the total number of training sessions.

Subjects of research

The subjects of the research were 30 teachers with the specialization of physical education, rural and urban, who teach both gymnasium and lyceum level.

Of these, 25 are female and 5 male.

The mean age of the subjects is 39.70 for female subjects and 40.83 for male subjects. Out of the 30 subjects 17 teach at high school and 13 in high school, 19 are urban and 11 in rural.

Table 1

SUBJECTS	TOTAL	Lyceum	Gymnasium	Urban	Rural
Man	44	41	3	32	12
Women	38	24	14	29	9

In the first phase we applied the Baecke questionnaire, which is a questionnaire evaluating personal physical activity and is divided into three distinct dimensions:

1. Work activity
2. Sports activity
3. Leisure activity

The Baecke Questionnaire puts questions about occupational, recreational and sporting activities, all based on weekly frequency. The subject responds on a nominal scale "never", "rarely", "sometimes", "often" or "always". For questions about sports and exercise, the perceived intensity (as mild, moderate or tiring) is included.

The questionnaire was applied at the beginning of the research and at the end of it after applying the proposed operational systems.

Table 2

Work activity	Response	Point	Sports activity	Response	Point	
1.What is your main occupation?	Low activity	1	9.Do you play sports?	YES, then calculate sport scor	5	
	Moderate activity	2		sscor \geq 12		
	High activity	3		sscor		
2.At work I sit	Never	1	10.In comparison with others of my own age I think my physical activity during leisure time is	8 \leq 12	4	
	seldom	2		8	sscor 4 <	3
	sometimes	3		< 4	0scor 0,01	2
	often	4			sscor = 0	1
	always	5			NNo	1
3.At work I stand	Never	1	11.During leisure time I sweat	Much more	5	
	seldom	2		More	4	
	sometimes	3		The same	3	
	often	4		Less	2	
	always	5		Much less	1	
4.At work I walk	Never	1	12.During leisure time I play sport	Very often	5	
	seldom	2		Often	4	
	sometimes	3		Sometimes	3	
	often	4		Seldom	2	
	always	5		Never	1	
5.At work I lift heavy loads	Never	1	13.During leisure time I watch television	Never	1	
	seldom	2		Seldom	2	
	sometimes	3		Sometimes	3	
	often	4		Often	4	
	always	5		Always	5	
6.After working I am tired	De foarte multe ori	5		Never	1	
	Very often	4		Seldom	2	
	Often	3		Sometimes	3	
	Seldom	2		Often	4	
				Always	5	

	Never	1		Never	1
	Very often	5		Seldom	2
	Often	4	14. During leisure time I walk	Sometimes	3
7. At work I sweat	Seldom	3		Often	4
	Sometimes	2		Always	5
	Never	1		Never	1
	Much heavier	5		Seldom	2
8. In comparison of others of my own age I think my work is physically	Heavier	4	15. During leisure time I cycle	Sometimes	3
	As heavy	3		Often	4
	Lighter	2		Always	5
	Much lighter	1		<5 minutes	1
			16. How many minutes do you walk and/or cycle per day to and from work school and shopping?	5-15 minutes	2
				15-30 minutes	3
				30-45 minutes	4
				>45 minutes	5

Table 3

Data on Second Most Frequently Played Sport		
	Finding	Value
What sport do you play most frequently	Low intensity	0,76
	Medium intensity	1,26
	High intensity	1,76
How many hours do you play a week?	< 1 hour	0,5
	1-2 hours	1,5
	2-3 hours	2,5
	3-4 hours	3,5
	>4 hours	4,5
How many months do you play in a year?	< 1 month	0,04
	1-3 months	0,17
	4-6 months	0,42
	7-9 months	0,67
	>9 months	0,92

Calculation of the indices for the three sections of the questionnaire is done in the following way:

Activity at work: $(I1 + (6-I2) + I3 + I4 + I5 + I6 + I7 + I8) / 8$

Sports Activity: $(I9 + I10 + I11 + I12) / 4$

Loisir activity: $((6-I13) + I14 + I15 + I16) / 4$

The questionnaire was applied online, respondents visited the <https://www.franchis-le-pas.fr/test-sante-4.html> site where they filled in with its translations by email, its points.

With the help of the computer, online indexes were established for the questionnaire.

The maximum score for each index is 5 points.

The total score is 15 points.

A total of at least 5 points is a very poor physical condition.

The total score of 5-10 points is a good physical condition.

The total of 15 points is a very good physical condition.

The questionnaire was applied to the final test only to urban subjects who had access to a suitably equipped fitness room.

Table 4

Women	Work activity	Sports	Loisir	TOTAL
X+Ds	3,9+0,49	1,64+0,358	1,54+0,64	7,09+1,28
Cv%	6,13	7,33	8,02	16,11

Table 5

Men	Work activity	Sports	Loisir	TOTAL
X+Ds	3,08+0,77	1,25+0,35	3,35+0,94	5,65+0,65
Cv%	38,89	17,67	47,02	32,88

Noteworthy is the fact that the female sample scored better than that of men in terms of physical activity at work and sports. Men have gained a higher score on physical leisure time activities, which means they practice more physical activities when they are at leisure.

Following the application of the operational systems and the Baecke questionnaire to the 10 subjects, we noticed in the final testing that most of them improved their physical condition.

In parallel with the Baecke test, the body mass index (BMI) was measured using the Jackson-Pollack, method for evaluating body fat percentage requires three skinfold measurements. For men, measurement sites are the chest, abdomen and thigh; for women, they consist of the thigh, triceps and suprailiac crest, or just above the top of the hip bone. Because measurements are taken in very specific spots, precise locations are typically measured and marked with a washable marker before the test is conducted. For consistency and accuracy, all skinfold measurements are taken at least twice on the right side of a standing, relaxed body and should never be taken after exercise, when a person’s fluid levels can interfere with accuracy.

The skinfold estimation methods are based on a skinfold test, also known as a pinch test, whereby a pinch of skin is precisely measured by calipers, also known as a Plicometer(Zonatto HA, Ribas MR, Simm EB, Oliveira AG, Bassan JC (Oct–Dec 2017), at several standardized points on the body to determine the subcutaneous fat layer thickness(Sarría A, García-Llop LA, Moreno LA, Fleta J, Morellón MP, Bueno M.,1998, Bruner R., 2001).

These measurements are converted to an estimated body fat percentage by an equation. Some formulas require as few as three measurements, others as many as seven. The accuracy of these estimates is more dependent on a person's unique body fat distribution than on the number of sites measured. As well, it is of utmost importance to test in a precise location with a fixed pressure. Although it may not give an accurate reading of real body fat percentage, it is a reliable measure of body composition change over a period of time, provided the test is carried out by the same person with the same technique.

Skinfold-based body fat estimation is sensitive to the type of caliper used, and technique. This method also only measures one type of fat: subcutaneous adipose tissue (fat under the skin). Two individuals might have nearly identical measurements at all of the skin fold sites, yet differ greatly in their body fat levels due to differences in other body fat deposits such as visceral adipose tissue: fat in the abdominal cavity. Some models partially address this problem by including age as a variable in the statistics and the resulting formula. Older individuals are found to have a lower body density for the same skinfold measurements, which is assumed to signify a higher body fat percentage. However, older, highly athletic individuals might not fit this assumption, causing the formulas to underestimate their body density.

Table 6

BMI	urban	rural		
Varsta - ani	25-35	36-50	25-35	35-50
Femei	23.5%	26.3%	22.9%	24.5%
Bărbați	24.8%	30.5%	21.5%	27.2%

Table 7

BMI	Highschool		Middleschool	
Varsta - ani	25-35	36-50	25-35	36-50
Femei	22.5%	26.4%	23.9%	24.2%
Bărbați	22.8%	24.8%	23.2%	27.2%

Discussions

Although the numbers of those overweight (BMI over 25) and obese (BMI over 30) are rising everywhere, The world health report 2002 revealed that Europe now has one of the highest average BMI of all WHO regions – nearly 26.5. Overweight affects some 25–75% of the adult population in countries of the Region. In many countries now, well over half the adult population is overweight although the lack of nationally representative data in many countries is still a major obstacle to a more accurate assessment of the scale and trends of the epidemic. According to the most

recent data on nationally representative samples from different countries in the Region, the prevalence of obesity ranges from 5% to 20% in men and up to 30% in women.

Studies show that the national average in Romania is 24.2%, compared to the Republic of Moldova, where the percentage is 24.6%, or the percentage in the neighboring countries, Ukraine 24.9%, Bulgaria 25.7%, Hungary 25.5%. The differences between the mass index between men and women in Romania and the countries in the area are not significantly different, which shows that eating habits and genetic information are largely similar, but the level of physical activity is different between males and females. Large body and body mass differences between men and women are recorded in Jamaica, where men have 24.8% of women at 29.9%.

Conclusions

The results obtained by measuring the body mass index revealed differences between women and men, as well as between groups of subjects with professional activity and domicile both in urban and rural areas. Thus, for urban men aged 25-35, a BMI of 24.8% was found, and for the 36-50 age group a BMI of 30.5% compared to men in rural areas where the BMI for the 25-35 age group is 21.5%, and for the 35-50 years old is 27.2%, which shows that for men living and working in urban areas, physical activity requires higher calorific consumption compared to those in rural areas that consume more calories than those in rural areas from urban areas.

Workplace activity for women shows an $X + Ds$ of $3.9 + 0.49$ Cv% 6.13, and for men the values are $X + Ds$ of $3.08 + 0.77$ Cv% 38.89 according to the Baecke questionnaire.

In the case of 25-35 year-old women, a BMI of 23.5% was shown, and for the 36-50 age group a 26.3% BMI compared to rural women where BMI for the age group of 25-35 years is 22.9% and for 35-50 years it is 24.5%, which proves that for women with domicile and activity in the urban environment, both physical activity requires a caloric consumption higher than those in rural areas that consume more calories than in urban areas.

The Baecke questionnaire also calculated an index for free time physical activity that records values for women $X + Ds$ 1,54 + 0,64 Cv% 8,02, and for men $X + Ds$ 3,35 + 0,94 Cv% 47,02, and for sport activity the values are $X + Ds$ 1,64 + 0,358 Cv% 7,33 for women, and for men $X + Ds$ 1,25 + 0,35 Cv% 17,67.

It has also highlighted a preoccupation with regard to diet, preliminary results of introducing a diet related to individual and professional exercise, are the subject of a study to be presented in a future paper.

Comparing the results between male and female samples revealed a predisposition to obesity for women, as well as for the professional and residential sample in the urban environment.

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Educational Guidelines of the School and Family to a Balanced Physical Development of Preschoolers

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Abstract

Physical activities in the form of play have an essential role in the cognitive, affective and physical development in preschool students, with long-term beneficial influences on the personality of the future adult. Harmonious physical development and maintaining an optimal state of health for preschoolers is the goal pursued by school through physical education lessons, but also the desire of parents to have a healthy and harmoniously developed child. To achieve this goal, it is necessary for the two educational factors - school and family to work together. Thus, a physical exercise program organized on a scientific basis during physical education lessons or sports activities reserved for preschool students should be supported and encouraged by parents, in the family. The research method used in the study was the method of investigation, which aimed at highlighting the involvement of the family in the harmonious physical development of preschool students, as well as establishing possibilities for collaboration between parents and specialists in order to support and improve their educational and formative process. In conclusion, it is noted that several directions of action are required, among which: the existence of programs whereby parents are informed about ways to practice physical activities of preschool children in their spare time; a close collaboration between the physical education teacher - parent - family doctor; practicing physical sports activities by parents together with their children.

Keywords: Education, Family, School, Physical development.

Introduction

Changes within all fields of activity are demanded by the need to meet certain qualitative standards for the economic, social, scientific, etc. progress of humankind. It is a difficult task for society – looking for human, material, technical resources – to reach these standards. In this respect, society is based on education, which ensures the cognitive, moral, physical, training of the members. Education aims to improve individuals and to prepare them for facing the demands of the society efficiently. Thus, health education aims to achieve a harmony of body functions (Boțiu, V. and Mihailiuc, H. apud Nicola Pende, 1993)

The etymology of the term education comes from the Latin verb “*educo, educare*”, which means providing care, feeding, growing. Hence, “education is a social, human-specific phenomenon, consisting of a conscious, organized and planned system of long-term influences, exercised by the adult generation on the young generation in order to achieve a certain type of person, pursuant to the demands of a concrete era and society” (Moise, C. and Cozma, T., 1996). Education is the one ensuring the culture of a people, a culture that enriches permanently, depending on external demands and requests.

Education is a long-term activity starting in the first days of life and continuing throughout an individual’s life. It is meant to improve an individual and to make them self-improve, to improve individual performances in all fields of activity.

According to Mileacova E., Dorgan V., Vashchenko M., childhood is the main life stage of a person in the development of their own nature: intellectual, psychological and physical. In this respect, the issue of the education system contents to support this development stage is of actuality. It is clear that the educational programs for children should correspond to those specific to the characteristics of those involved, as well the demands of society (Mileacova E., Dorgan V., Vashchenko M., 2018).

Ideal human personality is the outcome of balancing physical, intellectual and moral development, a combination

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that subsequently becomes a basic stimulus for activating and cultivating aptitude resources. The failure to achieve such harmony leads to a type of education producing “crippled” individuals, most of the times. The behaviour, aspirations and successes of such persons will be partial at the most, thus fractioning the efficiency of their action, which leads to personal dissatisfactions and failures, but also to the discontent and lack of service for the society. Professor Nicolae Mărgineanu, 1999, in one of his studies regarding personality structure in terms of individual differences and dissimilarities between adaptive and social integration capacities, underlined that the intelligence of our conduct and the chances of our integration depend decisively on “*the organization of our culture and intellect*”. According to Professor D. Salade, 2000, “this culture valued by intellectual organization must be seen in behaviour, not only in the storing of information and knowledge”.

It is important to know that education has two main objectives: the first is to provide children with general notions that they may need in the future; the second objective consists in preparing today’s child for tomorrow’s ADULT. The purpose of education is reached when an individual obtains that autonomy determining them to master their own destiny and their own personality. Maurice Debesse said “education does not create the child but helps him to create”.

In order to analyze the educational phenomenon from the perspective of family and school, the *method of literature review, the observation method and the survey method* were used.

The educational forms and factors contributing to the well-balanced physical development of preschoolers

Education is a long-term activity starting in the first days of life and continuing throughout an individual’s life. It is meant to improve an individual and to make them self-improve, to improve individual performances in all fields of activity.

Family is the factor orienting and forming an individual from a multi-direction perspective, with the role of forming behaviours, abilities and habits or of interiorizing elementary states of mind. Faults manifested at this level have a decisive, deep and long-term influence on the behaviour of the youth. Most of the times, these faults installed or “acquired” in the family are largely irreversible.

Family integrates the child in the civilization through expression and example, and less through theory. Family must form, not inform; a child “extracts” the first impressions from the family environment, thus forming behaviours through imitation and direct contagion. Children will act and believe like their parents, by imitating their behaviours. In this respect, we believe that the existence of family education concerning the material and spiritual aspect would be a way to solve successfully the social shortcomings regarding the aspect of professional and social behaviours. Hence, from the perspective of forming the skills of practicing sporting physical activities contributing to well-balanced physical development and to optimal health, parents represent an incontestable model for the children.

In agreement with H. Rudolph Schaffer, we argue that children’s behaviour is influenced by, but at the same time, it influences parental; further long, it influences and it is influenced by the relationship between the father and the mother; in its turn, it influences and it is influenced by the nature of parental activities. (Schaffer, 2010) In the same context, we argue that school contributes to the educational process of children and of parents, indirectly.

Education achieved in the family (by the parents) can be substituted, in the first years of life (until the age of seven), by certain institutions that parents may use – nursery schools, kindergartens, schools. Even from this age, children are initiated regarding behaviour to the parents, siblings and those to whom they contact. Hence, “*educating means cultivating the spiritual purity and propriety of children and young people, raising a child morally and piously, taking care of his/her soul, modelling his/her intelligence*”.

School represents an important factor of systematic and continuous education. In school, education has diverse forms, through individual and common activities. Students learn certain behaviours from each other, this aspect being controlled by trainers (educator, preschool teacher, teacher). The contents of the instructive-educative process conveyed in school are selected by educational psychology criteria. Didactic activities are designed by observing the didactic principles. The most adequate and pertinent learning-teaching methods are used. Specific knowledge, attitudes and behaviours need to be fairly evaluated and appraised.

The educative-formative process involves specialized staff members that hold psychopedagogical, moral and methodical skills, besides professional skills.

Education is conducted and completes an individual’s personality through several forms: formal education, nonformal education and informal education. School – part of the formal education – has an important role in orienting and modelling human personality, with pedagogical methods and means adapted to the students’ development needs. School – besides the informal component – also comprises a formative component; through which students learn how to use the information received to their own benefit and for social benefits. Hence, school *physical education* represents a discipline aiming to achieve the well-balanced physical development, to maintain optimal health and mostly to

create among the students the habit of exercising independently throughout their lives. Forming the habit of exercising independently determines long-term benefits; hence, the future adult will be a healthy person, capable of conducting high-quality professional activities, thus requiring minimum medical expenses. It is important to know that habits form in time and that they must start at least in preschool age. Family support is essential throughout the formative path of young students; it represents the main model for the future adult. Hence, it is recommended for family to conduct sporting physical activities along with children and to support their constant practice over time. For instance, the Finnish education model is worth following because this country has the lowest school dropout rate. Hence, the Finnish success is due to combining three educational factors: family, school and socio-cultural resources (libraries, recreation activities, sporting activities, etc), interconditioning and functioning in a coordinated manner.

In addition, nonformal and informal education contribute to the formation of an individual, with an important role in the educative-formative process of peers. Formal education ensures the basis of education, of the development of an individual's personality, while *nonformal and informal education* has the role of completing the knowledge obtained within formal education. On the other hand, it provides the possibility of consolidating and/or improving physical aptitudes for the topic we approached. The advantage provided by nonformal and informal education is that the multitude of formation variants allows children to participate to educative-formative activities along with their parents, a very important mental aspect for students in formation.

Well-balanced physical development represents the qualitative aspect of the growth and development process of preschool students and – for this reason – we should pay a special attention to this phenomenon. Hence, the active and conscious participation of the two factors – school and family – is necessary, because it has a complementary role in the growth and development process of preschool children.

The implications of school and family in the well-balanced physical development of preschoolers

In order to understand the sports phenomenon and the one of school physical education, there should be a conceptual delimitation between them. Hence, *physical education* is a component of education and it contributes to forming the human personality, but it does not subscribe to the notions of competition and contest at the same level with sport, but it assumes the acquisition of essential elements contributing to a complete personality. This component of education comprises several activities contributing to the development of human being by cultivating and stimulating the psychophysical dimension, by keeping a harmony between physical and mental, between psychomotricity and intellectivity, will and emotivity. Physical education is physiological through the nature of its exercises, pedagogical by method, biological by its effects and social by organization and activity. On the other hand, *sports* related to the notion of *competition and performance*, consisting in the “victory” of man over human nature, while *physical education* should be regarded as a way to consolidate and to improve the relations between all the dimensions of personality, as a possibility to improve the beings from all points of view.

School, through the subject of physical education, contributes to completing the personality of students and thus to a well-balanced physical development. In order to underline the importance of practicing physical education within a formative framework, we will outline as follows the specific and non-specific tasks to be achieved within the discipline, proposed by I. Nicola:

Specific tasks: student's well-balanced physical development; consolidation of physiological capacities (normal function of organs and systems); creation of harmony between body and soul; development of motricity, of motion easiness, of activating body functions; correction and improvement of physical deficiencies; observation of health and hygiene rules.

Non-specific tasks: stimulation of cognitive processes – the development of perceptive acts, of observation spirit, of attention, of thought in action; the development of affective processes – of feelings, joy, satisfaction, emotion control, confidence in one's own forces; consolidation and education of volitional capacities – courage, perseverance, spirit of initiative, persistence, spirit of justice and fair-play, wish to self-improve, avoidance of selfishness and individualism; acquisition of psychomotor skills – strength, rapidity, precision, coordination, mobility (I. Nicola, 1996).

The complexity of the subject of physical education becomes concrete in a series of objectives holding diversified functions in order to complete students' personality. Hence, Macavei (apud Cucos C, 2002) ranks the objectives of physical education, with the following functions: sanotrophic, from a motor standpoint, formative from an intellectual and moral-volitional perspective, social functions.

Objectives with sanotrophic functions, targeting the correct and well-balanced physical development:

- Recreation and fortification of the body;
- Increase in exercise capacity.

Objectives with formative functions, from a motor standpoint:

- the development of motor capacities: force, speed, resistance, skill;
- the development of basic and utilitarian-applicative motor skills: walking, running, jumping, throwing, climbing, crawling, pushing, traction, weight carrying;
- forming the knowledge and abilities necessary to acquire complex motor acts (sports branches – gymnastics, track and field, sports games).

Objectives with formative functions from an intellectual and moral-volitional perspective:

- the development of observation spirit, of imagination, of creativity, of tactical thought (specific to certain games and to certain individual sports);
- the development of solidarity and co-operation spirit, of respect for partners, opponents and the public and of fairplay spirit, of positive attitude of behaviour in a group;
- the development of perseverance, audacity, courage, self-control, etc.

Objectives with social functions:

- forming the habit of systematically exercising outdoors and the acquisition of methodological knowledge and skills that allow their independent practice;
- the development of intrinsic motivation for physical education, the interest for practicing physical exercise under various forms;
- selecting and training gifted individuals, in order to include them in high performance sports;
- the recovery or rehabilitation of individuals with motor or organic, temporary or permanent disability. (Cucos, C., 2002)

The role of family in the valorisation of leisure time among preschool students

The formation process for human beings is complex and delicate, because it is a lifelong process. In order to educate, to elevate, to achieve a cultivated person (*homo sapiens*), with current demands, involves committing to a conscious, organized, systematized activity, with finalities adapted to current times.

A person is educated from early childhood; people grow and develop using information from the family and from all levels of institutions, by age, aspirations and social standards/limitations. They receive educational influences systematically, consciously, within formal education, which also includes body and sporting activities, but they continue to be subjected to other types of influences within nonformal education, in their free time.

The efficient organization of formal activities allows an individual to learn behavioural models that they subsequently transfer in daily social practices. Such is the case of certain intellectual knowledge or operations, of attitudes, interests, and of motor structures and motor behaviour patterns. By learning in school a certain body posture, a certain game, children will transfer them in their family activities or in their community – playgrounds, activities in their group of friends. Such transfer may become even more complex if they manifest interest for a specialized sports branch and if they practice it in their leisure time, within a club or a sports association. It is significant if school acquisitions are enduring, if persons educated in the formal system manage to maintain behavioural models active for long periods (in case of sports activities, if they practice them throughout their lives), by realizing their social, professional or health value.

The nonformal dimension comprises all educational influences outside the classroom, through optional or chosen activities. The term “*nonformal educational reality that is less formalized or nonformalized, but always with normative effects*” (Cozma, T., 1988). Within nonformal education, actions are coordinated by specialists (teachers, coaches, researchers), but “*they play their roles more discretely, often assuming a mission of animators or moderators*” (Văideanu, G., 1988). The relation between nonformal education and formal education is complementary, in terms of contents, ways and forms of achievement (Cozma, T., 1988).

Pierre de Coubertin argued the importance of recovery time following intellectual effort, not as a time without activities, mostly for young people, but as a time for physical activities, meant to allow active rest and a restoration of mental and physical effort potential. Currently, the attraction of movement is in competition with the attraction of simulated movement – such as action movies, video or computer games. Young people feel the need to exercise, but not by actually moving, but by empathizing with the fictional characters. The phone, the tablet, etc, are closer than the gym, easier, more accessible (close to everyone) in a family environment, at any hour. They are fashionable, but also more harmful. The effect of the types of movements (physical and ideomotor) is not the same. Young people must be taught that exercising per se may not be replaced, in terms of health effects, by any other type of stimulation. Movement, competition is a means to construct personality and at the same time an effective therapy for physical and mental dysfunctions. Physical activity contributes to acquiring a correct body stance from an anatomic perspective.

Leisure – from an occupational perspective mostly at the level of young people may represent a research topic for

specialists in the field of sport pedagogy and a field that brings necessary contributions, implicitly. There are too many cases when young people spend their leisure time through the same time of activity as the mandatory one – work, study – and they fail to recover after effort. Many other young people spend their leisure time doing nothing – such realities require pertinent solutions, to solve such issues.

Conclusions

Sports physical activities have become a social, disseminated, popularized activity. Education in sport and through sport should not be left unorganized, because this opacity may lead to the emergence of phenomena such as lack of sportsmanship, violence in sport, lack of fair play, doping, which pervert the initial and authentic meaning of Olympic spirit.

Health represents a state without which no person can perform in any field of activity, and the quality of life is low.

Family represents the orienting model of children; for this reason, it should hold a minimum of education to allow “educating” their own children for their physical, mental and intellectual development.

School is an important factor contributing, along with the family, to the formation of a child’s personality, by conveying knowledge that the future adults may use throughout their lives.

The constant practice of sports physical activities helps children, teenagers, adults and the elderly alike to maintain and consolidate an optimal health state. Exercising contributes to the physical and functional recovery following traumas; it is a means of mental relaxation. It is known that physical exercise practiced constantly contributes to the treatment of depression, psychosis, etc.

Sports physical activities hold an important category of actuating means providing the possibility of improving the quality of life and of maintaining optimal health status.

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Role of Psychomotor Conducts in Bodily Modelling

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Abstract

Given that nowadays obesity, lack of exercising and the teenagers' interest for technology seems to take over their life, we believe that the topic of the present paper is necessary and of actuality. Motricity – with all its components – contributes to an enrichment of the biologic and psychological heritage of teenagers through a systematic and continuous action. Physical exercise, as main instrument, is the biological stimulus that by accumulation ensures both a harmonious physical development and a balanced education of the motor skills and qualities. *The purpose* of this study was to influence the Body modelling of female high school students, pursuant to their level of psychomotor development. In order to conduct the research, we started from the *assumption* that, by applying a program of aerobic gymnastics, we will highlight the role of psychomotor components in body modelling. The subjects of the research were 13 female students (11th grade C) at the “Emil Racoviță” National College Iași. We applied the following motor tests: *the Flamingo balance test, the Matorin test, the motor memory test*. The independent variable of the study was represented by average-level aerobic gymnastics programs pursuant to the psychomotor development level of the female high school students. The aerobic gymnastics sessions took place three times a week and they took 50 minutes each.

Findings. The statistical-mathematical interpretation of the data shows that in the Flamingo test, the subjects recorded an increase in values from 27.07 seconds to 34.61 seconds; in the Matorin test, we noted an improvement of the values recorded on the right side (360.38°) compared to the one on the left side (347.30°), given that most subjects are right-handed. Exercises executed mainly using this side had higher values, too. The motor memory test has shown an increase in the values from 2.75 movements executed correctly leftwards and from 3.875 to 7.571 movements correctly performed rightwards. In the sense of the aforementioned statements, it may be concluded that the aerobic gymnastics routine proved effective, thus improving the components of psychomotricity, namely the basic motor conducts, the neuromotor conducts, the perceptive-motor structures and conducts.

Keywords: psychomotricity; body modelling; aerobic gymnastics; fitness

Introducere

The concept of body and its relations with the environment were initially of a psychological and metaphysical nature. Thus, the ego represented the thought, the conscious activity of the subject, while the body was assimilated only to its tangible limits in space. Related to the high school cycle, motricity is not limited to school syllabus, but it represents the control over one's body, the processing of information, the construction of certain types of reasoning and the use of various types of expression; the acquisition of each movement is actually an “experimental approach”, experienced by the body. According to Epuran (1990), bodily experience has at least three dimensions: perception of one's body and of what happens in the body; accumulation of experience through motor, bodily action; the use of the body for their own examination, to create an image or a state.

In the last decades, researchers have concluded the emergence of negative trends concerning motricity, especially a decrease in the resistance indicators of the young people's bodies. These negative effects are generated by the diet, increasingly inadequate, and by sedentariness, also with an increasing trend. A very profitable social and individual short-term and long-term investment is sport promotion, which has a major contribution physical and mental fitness, to dynamism and resistance, to performing psychosocial conduct.

In the scientific literature, *psychomotricity* is considered both a complex function and an aptitude, which integrates to the same extent aspects of motor activity and manifestations of the perceptive functions. According to Herrero (2000), psychomotor intervention is an activity that is performed in order to enhance an individual's potential development through the use of the body, action and motion. These activities can be seen as tools that toddlers use to relate to themselves, to others and to the world around them.

The motor act gains importance as an adaptive resource as it plays a role in the interaction between the subject and the environment, with the body serving as a means of communicative expression that the child uses to aid in the

formation of mental representations of the world from these experiences, a process that begins in the sensory motor intelligence period (Mas & Castellà, 2016). Psychomotricity is the result integrating education and maturation of motor and mental functions, and, regarding the movements, it refers to their determination: will, affection, needs, and impulses (Abalaşei, 2012).

Arcan (1980), cited by Albu et al., (2006) defines *psychomotricity* as a complex function integrating and conjugating motor and mental aspects, elements that will influence the behaviour of a person. Practically, movement is not a mere ambulation of the body segments, but it involves an action conducted with a certain purpose.

The body can be seen as a means of relating to the self, to the others and to the environment (space, time, objects). Based on this assumption, three main directions of psychomotricity may be highlighted: forming the relationship with the self, achieving a relationship with the others and the contact with the environment (Albu et al. 2006). The psychomotor conducts of each individual evolve depending on his aptitude potential, on the degree of physical and intellectual development and, not lastly, on the educative influences during his childhood. Through his components, psychomotricity makes possible the pragmatic adaptation (learning professional, manual, intellectual abilities), social adaptation (efficient interpersonal communication techniques), aesthetic adaptation (bodily expression), educative adaptation.

The school and the teacher have, especially in the initial years, important role, influencing directly in the development of the student. When it comes to physical fitness, professionals can use recreational games and games that stimulate various aspects of the child, as the engine, the social, affective and cognitive (Silva, 2013).

Currently, physical education designs full training students through human movement. The daily search for tools that help in school learning are guided by the multidisciplinary. Physical education and Psychomotricity current together develop the children's intellectual and motor aspect. This performance is achieved in understanding the importance of inserting elements of psychomotricity in the school environment, aiming to become the global formation of the student (Monteiro, 2006).

Psychomotor education provides that child can overcome various obstacles, finding themselves within the social environment. The joke awakens the desire for discovery and exploration, being direct channel so that the child can express their most varied emotions. During the physical education lessons, the teacher should not be guided by the execution of mechanical movements, but the exploration of the body as a whole (Camargos & Maciel, 2016).

Components of psychomotricity and of motor conduct

According to M. Epuran (1990), the components of psychomotricity are: body scheme, segmental and general dynamic coordination, laterality, static coordination – balance, perceptive-motor coordination (perception of space, time and own movements), rapidity of movements, ideomotricity – as dynamic synthesis of the body scheme and of the perceptive-motor coordination with the motor task.

Picq & Vayer (cited by Albu et al., 2006) distinguish between three types of activity in children: basic motor conducts, neuromotor conducts, perceptive-motor conducts and structures.

The basic motor conducts are more or less instinctive and they comprise: eye-motor coordination, static and dynamic balance and general dynamic coordination.

Neuromotor conducts are closely connected to the maturation of the nervous system and they include: proprioceptivity and muscle tone.

The perceptive-motor structures and conducts are related to intelligence and they comprise: body scheme, laterality and spatial and temporal orientation.

Body modelling

Body modelling represents a new concept in current society; referring to redefining one's shape and improving the aspect of the skin, thus involving a therapeutic conduct where a change in lifestyle and diet habits must be conjugated with muscle toning. The instruments we may use to intervene in Body modelling may be the following: physical exercise (aerobic gymnastics, fitness, jogging, dance), proper diet, massage, cosmetic procedures, etc.

Furthermore, in the opinion of certain authors, body shape may be associated with some personality traits. For example, a thin body shape is often associated with attractiveness, success, control and freedom, while a larger body shape is associated with unattractiveness, lack of success, overeating, laziness, and lack of popularity (Ogden, 2010). It was indicated from this study that personality traits are associated with body shape. The results showed that a normal figure was rated most positively and the very thin figure was least likely to be regarded as favourable or active. Overall, figures farther from normal were rated as less active and less favourable. A thin figure was rated as more reliable than a large figure. In future research, international comparisons are needed because personality traits being associated with body shape could vary by culture (Namatame et al., 2015).

Body image is defined as a multidimensional construct - with perceptual, cognitive, affective, and behavioural components - that refers to individuals' perceptions of and attitudes toward their own body, especially its appearance (Cash, 2004). Body image dissatisfaction has several negative psychological correlates (Sarwer, Thompson, & Cash, 2005). It could be a risk factor of eating disorders (Stice & Shaw, 2002), and also mediates the relationship between obesity and mental disorders (Gatineau & Dent, 2011).

The results of Béres et al. study demonstrate that even a one-hour aerobic exercise could have a positive effect on body image; individuals who are at risk for exercise addiction are more sensitive to the beneficial effect of exercise on body image (Béres et al., 2017).

Conceptual delimitations regarding fitness and aerobic gymnastics

Fitness is a broadly used term, which in limited sense indicates the level of cardiovascular system function as a result of high energetic reserves. It represents a state of wellness that allows the individual to face the physical and functional loads within daily or sports activities, being dependent on the general body resistance (Niculescu, 2008).

According to Allesen, Harrison and Vance (cited by Luca A., 2001), fitness designates a set of attributes through which an individual faces the physical and functional loads within daily or sports activities, depending on his anatomical, physiological and psychological condition. Fitness is influenced by age, sex, an individual's constitution and his lifestyle. Any man or woman begins life with a morphologic and functional potential, determining the limits for health and fitness. Physical fitness is associated with many traits and attributes required for resilience. As such, it is one pathway toward resilience. Promoting physical fitness as a pathway to resilience is based on solid, scientific evidence as noted in many ancient and current sources showing that physical fitness blunts stress reactivity, confers physiologic and psychological benefits, serves as a buffer against stress, and can protect against stress-related disorders and chronic illness (Deuster & Silverman, 2013).

Today, it may be said that one of the most practiced types of physical activities, which became a fashion, thus managing to engage as many practitioners as possible, is aerobic gymnastics. In Romania, as in the other States of Europe and America, aerobic gymnastics represents a lifestyle, one of the most efficient and attractive ways to obtain good fitness, to relax and to separate from daily life and, at the same time, to recover and invigorate for future activities.

Examples of aerobic exercise include, cycling, dancing, aerobics, hiking, jogging/long distance running, swimming and walking. These activities can best be accessed *via* the aerobic capacity, which is defined by the American College of Sports Medicine as the product of the capacity of the cardiorespiratory system to supply oxygen and the capacity of the skeletal muscles to utilize oxygen (American College of Sports Medicine, 2013).

Aerobic exercise appears to have some beneficial effects, but its contribution is limited on frequency and quantity (Patel et al., 2017).

Aerobic gymnastics contains a complex system of physical exercises, conducted with high oxygen consumption, for the best body development and for maintaining it in a good state of function, for relaxing the nervous system, for good mood, grace, elegance in movement rhythm and musicality (Ferrario & Aparaschivei, 2004). Starting from the possible effects of aerobic gymnastics, in the society or on each person, we discover the multitude of functions that it may accomplish: the function of ensuring and improving a well-balanced physical development; the function of improving motor qualities; the educative function, of emulation, aesthetic; the conative function, of satisfying the actuating movement needs; the integrative-social function (Nanu, 2009). Due to the gradually increasing accessibility, aerobic gymnastics provides the possibility of valorising the personal accumulations of the individuals in the society, by the capacities they acquire and train. It defines a universe of human creations, of an artistic and intellectual nature.

Also, various studies have been published that prove the advantages of aerobic exercise in reversing and preventing cardio-vascular disease. Wisloff et al. (2002) were the first who showed the benefit of aerobic training in the myocardium after an ischemic event.

Material and method

The purpose of the paper was to influence the body modelling of female high school students, pursuant to their psychomotor development level.

For elaborating this paper, we started from the *hypothesis* that, by applying aerobic gymnastics routines, we will be able to highlight the role of psychomotor components in body modelling. In order to assess the hypothesis, we conducted an investigative experiment at "Emil Racoviță" National College Iași, throughout the school year 2017-2018. Within our experiment, we had two tests: *initial testing* (October 2017) and *final testing* (May 2018), depending on the schedule of the 13 students who represented the subjects of the current study.

We applied the following motor tests: *the Flamingo balance test* (assessing static balance), *the Matorin test* (concerning general dynamic coordination, laterality, body scheme and dynamic balance), *the motor memory test*

(concerning laterality, body scheme, motor memory and general dynamic coordination) (Mackenzie, 2005).

The independent variable of the experiment consisted in applying aerobic gymnastics routines (Hi-Low impact aerobic), twice a week for 6 months, pursuant to the psychomotor development level of the female high school students. The aerobic gymnastics session lasted one hour and comprised three parts (the warm-up, the fundamental part and the closing part).

The first part of the session comprised exercises for the warm-up of the locomotor system and structures of steps specific to aerobic gymnastics, which concerned the improvement of the cardio-respiratory system. The second part included exercises for developing the main muscle groups and for improving mobility and muscle elasticity. The last part contained stretching exercises helping the body restore the initial physiological parameters.

Results and discussions

Table 1. Values obtained in the Flamingo balance test

Statistical indicators	Initial testing (seconds)	Final testing (seconds)
X	26.07	34.61
S	±5.484	±4.805
CV	21.03%	13.88%

It is notable that in the Flamingo balance test, the average increased by 8.54 seconds, the dispersion degree decreased by ±0.67, while homogeneity improved by 7.15 percentage points.

Table 2. Values obtained in the Matorin test

Statistical indicators	Left	Left	Right	Right
	Ti (grade)	Tf (degrees)	Ti (degrees)	Tf (degrees)
X	335.38°	347.30°	346.92°	360.38°
S	± 33.32	± 32.63	± 53.13	± 50.51
CV	9.93 %	9.39 %	15.31 %	14.01 %

In the Matorin test, the average increased by 11.92° leftwards and by 13.46° rightwards; standard deviation decreases from ± 33.32 to ± 32.63 in the testing conducted leftwards and from ± 53.13 to ± 50.51, in the testing conducted rightwards; furthermore, homogeneity has recorded an improvement of 0.54 percentage points in the testing conducted leftwards and of 1.3 percentage points in the testing conducted rightwards.

Table 3. Values obtained in the motor memory test

Statistical indicators	Left	Left	Right	Right
	Ti (no. of correct movements)	Tf (no. of correct movements)	Ti (no. of correct movements)	Tf (no. of correct movements)
X	2.75	5.625	3.875	7.571
S	±1.281	±1.187	±1.125	±0.534
CV	46.58%	30.63%	20%	7.05%

We have noted that in the motor memory test, the average increased by 2.875 leftwards and by 3.696 rightwards; standard deviation decreases from ±1.281 to ±1.187 in the testing conducted leftwards and from ±1.125 down to ±0.534, in the testing conducted rightwards; in addition, homogeneity has recorded an improvement of 15.95 percentage points in the testing conducted leftwards and of 12.95 percentage points in the testing conducted rightwards.

Regarding other studies focused on balance we found a research that shows aspects about static balance manifestation in sporty and unспортy children, aged 10 to 12. The research was based on protocols with registrations of standard duration postural stability, with and without visual control. Following the interpretation of the results, they underline the fact that the subjects in the sporty group obtained higher values compared to the unспортy group, due to an increased muscular development and to the balance improvement exercises during the specific training.

In order to improve the body balance ability, the exercises used should be as varied as possible, so that they generate multiple reorientation and rebalancing reactions and be performed systematically and continuously.

Assessing the balance ability is an important aspect as it represents a means of emphasizing the functioning of the systems that help achieve posture control, that is the proprioceptive, vestibular, visual and central nervous systems. It is particularly important in assessing and training the motor ability in children who practise performance sports; it helps diagnose or identify certain balance disturbances and assess the treatment efficiency (Moraru et al., 2014).

Another study about coordinative abilities was found by Mohammed Gaber Abd El-Hamid in 2012. The author returns that to the coordination abilities training program that includee exercises specified to improving the record level of all national youth project's events. Moreover, the selected exercises suit youth athletes and the events on topics. That is consistent that the coordination abilities exercises lead to the improvement and development of the skills level and performance, thus the record level, if included in a standardized programs and in a scientific manner specified to youth athletes (Abd El-Hamid, 2012).

Jessica Tallet et al. (2015) discussed in one of their article about of the nature of the relationship between motor routines, action selection, and procedural learning in children with typical and atypical development. Such studies suggest that (1) the desirable equilibrium between stability and flexibility maintained by a mature behaviour can be achieved by a system that forms motor routines and (2) the level of equilibrium between persistence and flexibility of motor routines is an index of the maturity of the motor system.

Conclusions

Upon interpreting the results, the following conclusions may be highlighted:

- Psychomotricity must be reconsidered, by the age of the subjects. The psychomotricity of a person ensures only partially motor performance. Motor capacity is thus a complex reaction to the environmental stimuli. It comprises psychomotricity (as natural psycho-physical endowment), general motor skills (as concrete and specific expression of those of the above), all influenced, structured and stimulated in various ways by the natural maturation of the functions, by practice and by the internal motivational factors.
- Body modelling represents a new concept in current society, referring to redefining the shape and to improving skin aspect, thus entailing a therapeutic relation where a change in the lifestyle and diet habits must be conjugated with muscle toning.
- The statistical indicators obtained in the two tests demonstrate that the aerobic gymnastics routines proved their efficiency, thus improving the components of psychomotricity.
- Given the optimization of psychomotor components, it is worth underlining their role in body modelling, namely the integration of motor and mental functions under the effect of the maturation of the nervous system, thus achieving a balanced behaviour of the individual. This confirms the hypothesis of the research, formulated initially.
- In the view of the modern pedagogy of bodily activities, a trained person represents a person who is aware of the importance of practicing physical exercise throughout his or her life, in order to maintain good health, who loves exercising and who enjoys physical effort. They actually represent the key concepts of lifelong learning, all of them having as common element the notion of human health with its three dimensions: physical, mental and social.

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Valuable Guidance in the Professional Training of the Future Physical Culture Specialist

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Abstract

Through this study, we will try to ensure the consistency between theory and practice, with the presumption that by having an appropriate curriculum, by promoting innovative methodologies and projects in the process of training the students from the faculties of physical education and sports, corresponding to the approach of professional ethics - sports, the behavior of educational service beneficiaries will be improved in their direction towards a more efficient sport culture.

The aim of our research is to reflect some aspects of the education guidance towards the training of ethical, deontological, personal, cognitive, professional, sporting and social competences.

Methodology of research: The scientific approach is an applicative research based on the analytical-interpretive study and consists in processing the processed information from the questionnaires administered to the participants. The participants during this survey were students from the faculties of: pedagogy, sport, kinetotherapy, on a sample of 135 students. in the study.

Keywords: physical education, training of behavior, valuable profile of the specialist in the field of physical culture and sport, valuable-attitude dimension of professional competence, SUPES students' valuable guide, ethical and professional training.

Introduction

At present, sport has been established among people as a means of moral exalting, because through the physical effort to overcome the opponent or a perfect figure of the opponent, inner qualities are developed, such as determination, courage, self-sacrifice, the spirit of sacrifice and perseverance, all these qualities consider the good order of a beautiful and good sports performance. Physical education is not limited to physical abilities, as it covers a broader range of abilities, emotional and social, as well as cognitive processes, motivations and moral concepts, with more than a recreational dimension. Involvement in various physical activities brings about a type of knowledge and understanding focused on principles and concepts, such as "rules of play", fair play and respect, tactical and physical awareness and social awareness correlated with personal interaction and team effort, in many of the sports. Ideal human personality can only result from the harmonization of physical, intellectual and moral development, a interface that later becomes the basic stimulus for activating and cultivating aptitude resources.

Professor Nicolae Margineanu (1999), in one of his studies on personality structure in terms of individual differences and the differences between adaptive and social integration capacities, underlined that the intelligence of our conduct and the chances of integration depend decisively on "the organization of our culture and intellect" and "this culture harnessed by intellectual organization must be seen in behavior, not just in the storage of information and knowledge", argues also Professor D. Salade (2000) (Stănescu, A., 2001, p.34).

The need for ethics is an objective fact, and the inherent respect of ethical norms is urgently needed in the sport world, if we take into account the "irresistible rise of aggression" (Busnelli FD, 2009)

The magnitude of the changes taking place in contemporary society requires new configurations in the value profile of the person in order to be actively involved in socio-professional life and achievement. Current reality often highlights examples that illustrate the inadequacy of a value basis for the subject in both social life and work.

The European Union, in its tendency to become the most dynamic knowledge-based economy, highlights the importance of the individual's potential for personal development and its contribution to the consolidation of a democratic, knowledge-based society. The new concept of higher education emphasizes the role of universities in forming citizens, possessors of skills, capable of self-development, with a value profile based on general human values, oriented towards community development. Therefore, the issue of value-orientation in personality

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development, including training of professional and transversal skills, is current and important, which explains our concern for this issue.

Personality development through educational actions centered on the promotion of values is reflected in the works of G. Allport 1937, E. Dupreel 1932, L. Kohlberg 1958, M. Golu 2002, C. Cucos 1996). Social integration as a direct result of the exercise by the internalization of educational heritage value of the company is elucidated by: S. Buzarnescu 2018, P. Ilut 2015 and some aspects of educational action in the context of ethical education appear to L. Kohlberg 1958, J. Piaget 1936 . The mentioned works denote the necessity of the concern for the axiological aspect of the vocational training, the framing of the value orientations in the educational approach, which has as a result the formation of the skills system of the emerging specialist.

The aim of our research is to reflect some aspects of the education guidance towards the training of ethical, deontological, personal, cognitive, professional, sporting and social competences.

Both the researches in the field and the educational practice confirm that in the professional training process there is no professional value reference on which to design and realize the training activity - integral development of the personality; it is obviously the lack of a coherent system of socio- professional skills needed by the specialist.

The research value profile does not claim to include the full range of roles, which would accurately define the socio-professional profile of the student. Taking into account the impact of recent transformations and expectations, we consider it necessary to redefine the value reference of the student - a key actor of an ever-changing knowledge society, and we propose a review of professional competencies to ensure the quality of vocational training in the context of society's challenges.

Methodology of research: The scientific approach is an applicative research based on the analytical-interpretive study and consists in processing the processed information from the questionnaires administered to the participants in the study.

The scientific approach was aimed at identifying student value orientations and focused on:

- Determining the students' ability to select the priority values register from a set of proposed values;
- Identifying the value profile of students at different faculties;
- Identification by students of the register of professional values, which will form the basis for their subsequent professional activity;

In organizing and conducting research, we started from the idea that the process of promoting values and training value orientations in the context of vocational training is neglected, which is in contradiction with new concepts about vocational training.

If we mention the structure of the questionnaire, we consider that the hierarchical selection of value preferences in a number of 9 variables is more timely and efficient in terms of organizing value-added taxonomies (4 total) and from the perspective of the selection facility. Thus, this moment of structuring allowed us to achieve impartial and accurate results, expanded our research area by obtaining four taxonomies and allowed us a qualitative analysis of the research results. In this way, we obtained four tables of nine variables, which were arranged according to the following criteria: VP1 – values-purposes (terminal), VP 2 – values-purposes, IV 1 - instrumental values, IV 2 - instrumental values.

This questionnaire was applied in parallel to a sample of 135 students of the SUPES Pedagogy, Sports and Kinotherapy faculties. We chose a faculty with a pedagogical profile and two other specialties requested by the students, but specific as a field of activity.

For the purposes outlined above, we should point out that the starting point at this stage was *the value reference*. Thus, the experimentally involved group in 2018 included the students of the second year in the composition of: 41 subjects - the Faculty of Pedagogy, 44 subjects - the Faculty of Sports, 50 subjects - the Faculty of Kinotherapy. Statistical data processing allowed us to perform an analysis of the obtained results.

If we refer to the value-purpose table (VP1), we record the results of the questionnaire in the following diagram:

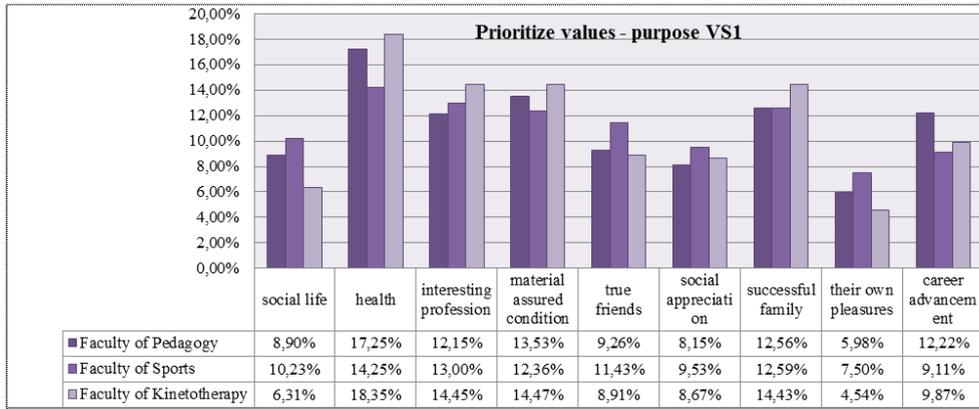


Figure 1 Value -purpose in respondent's opinion.

Analyzing Figure 1, we note that the highest priority values are *health and material status*. For students at the Pedagogy and Kinetotherapy Faculties, *health* records the highest frequency of 17,25% and respectively 18,35% of their *pleasure values*, with a frequency of 5.98% and respectively 4,54. Values with an average frequency of around 10%-14% are: *an interesting profession, a materially assured situation, a successful family*, for the Faculty of Pedagogy and Kinetotherapy. The students of the Faculty of Sports have given preference to social life – 10,23%, social appreciation – 9.53%, to real friends – 11.43%, options having higher weights compared to other faculties. We mention the value with the lowest frequency at the three faculties is the *pleasure*, followed by *social appreciation and social life*.

Thus, we find that for the students of the Pedagogy and Kinetotherapy Faculties, high priority values (HPV) are personal values *health and assured material status*, which proves that these students are young people who have just exceeded the adolescence period but who have not yet adhered to a code of social values, which explains their average frequency. We note that in the case of the students of Sport, the orientation towards the axis of social-spiritual values is crystallized, which can be explained by the social activity, which is advantageous by the affiliation of these students to a sports team, who are more involved in sports competitions and thus valorize the interpersonal relationships. So, the social environment and reality feed the students' representations about the context and social status.

In the case of the other table with value-purpose (VP 2), we find another distribution of variables.

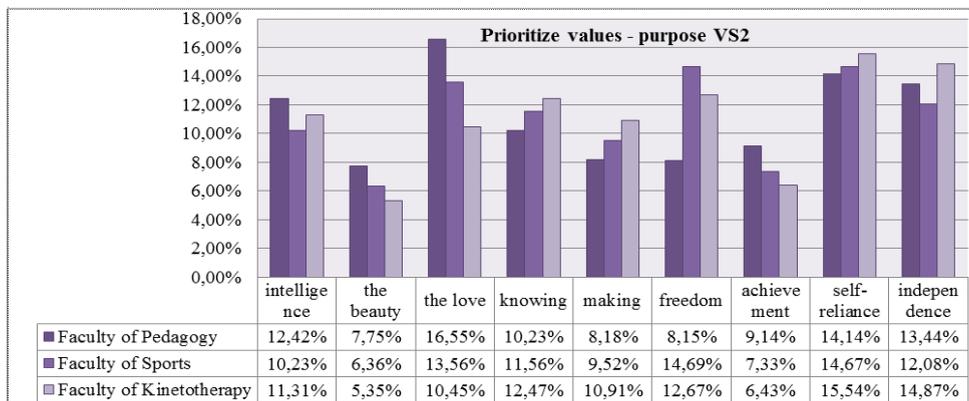


Figure 2 Value-purpose in respondent's opinion.

Thus, we observe a uniform distribution (10%-15%) of the priority values of *intelligence, independence and self-confidence* in all faculties. We assume that *intelligence* is in the top by the correlation of phenomenon with age and study activity, and *self-confidence* is the variable that students tend to take, given that they are at the beginning of a new phase in their lives. A significant difference is *love* for the Faculty of Pedagogy with a weight of 16,55%, a phenomenon that can be explained by the specifics of the profession.

In this context, we also find the low interest of the students for *beauty and creation*, which are the lowest weighting options, the Faculty of Pedagogy – 7,75% and respectively 9,14%, the Faculty of Sports – 6,36% and respectively

7,33%, the Faculty of Kinetotherapy– 5,53% and respectively 6,43%, values that are promoted in the pre-university education.

By following the frequency of the values in this figure, we observe incoherence on certain dimensions. Thus, the desire for knowledge of the students of the Faculty of Kinetotherapy is commendable, but they show little interest in *creation and beauty*, which are important tools in knowledge. Or, subjects from the Faculty of Sports aspire to *self-confidence* (14,67%), but less perceive the role of *intelligence* (10,23%) and to *becoming* (9,52%) in obtaining it. We can assert with certainty that students have not built a system of fully internalized values and do not quite understand how to achieve the goals they are aiming for. Unlike Figure 1, this table lacks high priority values, and the highest frequency is recorded by *love* (16,55%).

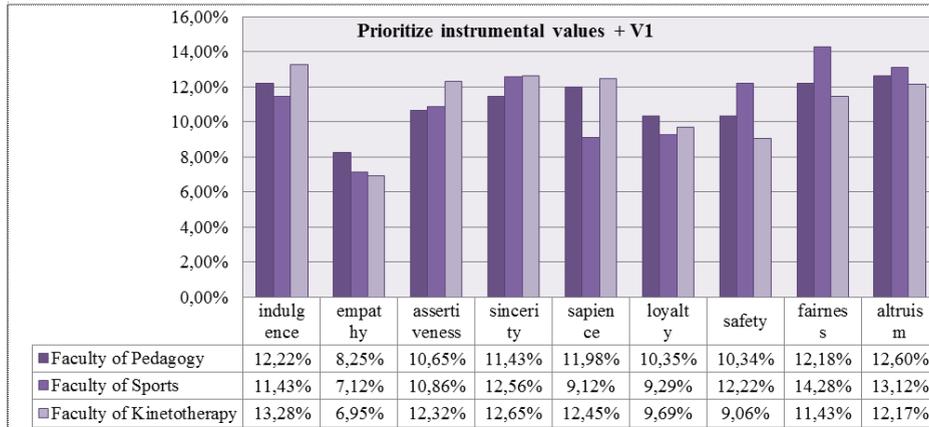


Figure 3. Instrumental values in respondents opinion

The fact that none of the table variables obtained more than 15% has shown us that there are no high priority values in this category among students. The most common references were for the categories of *indulgence, assertiveness, sincerity, patience and fairness*. Starting from this homogeneity, we can say that the subjects preferred the moral values proposed by the pre-university environment. Moreover, we note the presence of the social desirability phenomenon, namely the tendency of the subjects to respond according to what is socially desirable. Or, if we are to develop the idea of social desirability, then we assume the influence of the spontaneous reaction, the defense of the self, the concern to appear in a favorable light both to the others and to the self. On the other hand, the almost homogeneous distribution of values to the three faculties shows us the value compatibility, albeit partial, with the field of activity.

In the students' opinion, empathy and loyalty are not the preferential values of the specialties they are studying. In essence, empathy and altruism are disparaging moral attitudes towards the world around us, and are extremely important tools for interpersonal relationships, a moment that is not perceived by the sample subjects at this stage.

The following figure contains instrumental values that claim to be valid for different areas of training.

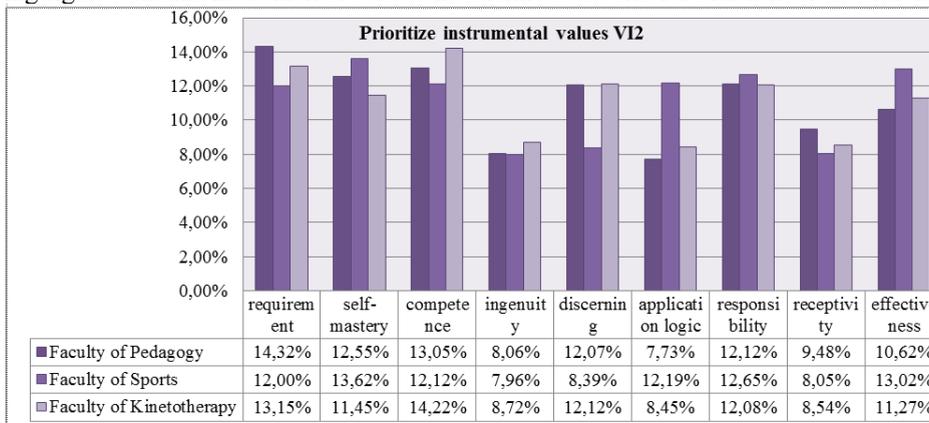


Figure 4 Instrumental values in respondent's opinion

Thus, the responsibility reaches a nearly homogeneous frequency at the three faculties; competence is a priority for the faculties: Pedagogy (14,32%) and Kinetotherapy (13,15%), and within the Faculty of Sports the weight of this value is only 12,12%. We note the low interest of subjects from the Faculty of Pedagogy for *application-oriented logic* (7,73%). We could explain this phenomenon by the fact that the studied subjects are predominantly socio-human, so students do not perceive the importance of this value for professional training.

We observe the increased interest of subjects from the Faculty of Sports (13,62%) for self-control and the average frequency of self-control values in the other two faculties; the demanding value is justified by the Faculty of Sports (12,00%) and the Faculty of Kinetotherapy (13,15%).

It is important to mention the reduced frequency of ingenuity and receptivity values. The psychology of the body activities (Epuran, Horghidan, 1994, p. 8) as an interdisciplinary sub-field of research of the psychology and physical education science deals with studying the intellectual and educational processes of the human involved in physical and sports activity. The fact that these variables are disadvantaged in relation to intellect and logic leads us to the conclusion that young people are between the search for identity and the confusion of social roles. Thus, in the internal desire to ensure unity and congruence, young people prefer to choose the cognitive component and avoid contradictions on the affective-evaluative and behavioral level. Physical education does not constitute a closed field but it is in a tight correlation with other disciplines of the education sciences, finally having a multilateral development of human personality.

Values are the most important things and principles for individuals. They imply our feelings, ideas and beliefs. Even if we are aware or not, we act according to a value system. Everything we do, any decision we make, it comes from within our own system of values. It is preferable to make decisions in our career in accordance with our own values. A good knowledge of these will help us to be responsible for the decisions taken in the individual career.

The training of key and transversal competences requires appropriate strategies, as well as the approach to multidisciplinary and transdisciplinary in the instructive-educational process. Also, in the case of training the professional – sports ethics of the students from the higher education institutions, it is necessary to approach the multidisciplinary of the complex learning situations of the specialized disciplines that are related to the professional-sports ethics, which will allow the realization of the new certain circumstances of learning, for the development of general competencies in the curricular and key areas, with the projection of the results and knowledge accumulated in the real life in which the students will perform their professional activity.

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Social Inclusion of People with Dissabilities Through Sports Activities

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Abstract

In the Republic of Moldova, the phenomenon of social inclusion through sporting activities can be considered as an interactive, knowledge, assimilation and practice of sporting values such as fair play, teamwork, team spirit, dedication, loyalty, competence, competition, engagement, tolerance, non-violence, etc. Thus, every person, regardless of his or her deficiency, must be treated as a member of the society. This requires permanent upgrades and refinements of the educational system, society, to adapt to the needs and needs of these people. Promoting the model of approach to disability based on rights and social valorizing roles is a current one, considering the theoretical and practical proofs that correspond to the international standards and political aspirations promoted by our society.

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Keywords: education, society, communication, psychomotricity, development, inclusion

Introduction

Using the analysis of one of the most recent definitions of inclusion, states, societies undertake certain commitments to implement it through the new approach to disability and new demands on integration processes and inclusion.

Inclusion, as the finality of normalizing and harmonizing the situation in modern society, starts from the recognition and acceptance of diversity, which is a specific right for every person, by the other social actors. With or without deficiencies, people are different - by their capacities, physical and mental potential, intellect, perceptions, visions, purposes, ideals, character, ways of relationship with others and with society. These differences, as a whole, constitute the individuality of the person, which makes it unique and unrepeatably (Racu, 2016).

Although the state has begun to develop certain policies for the social inclusion of people with disabilities, essential changes are not felt by both people with disabilities and by service providers in the field.

According the observations of the UN Committee (Convention on the Rights of Persons with Disabilities, 2006) it is clear that the model of medical disability approach persists in the Republic of Moldova, and social inclusion policies are sectorial tackled and are considered to be the responsibility of the Ministry of Health, Labor and Social Protection without clear coordination mechanisms between all government institutions (ONU, 2006).

The given paper **aims** to promote sport for people with disabilities as an effective means of increasing their social inclusion degree and reducing their stigma and discrimination.

In order to achieve the proposed goal, the following **objectives** were formulated:

- substantiating conceptual approaches to social inclusion and disability;
- studying models of disability approach;
- analysis of the situation regarding the number of people with disabilities;
- determining the role of psychomotricity in performing sport activities for the purpose of social inclusion of people with disabilities.

Theobject of research is the social inclusion of people with disabilities from the perspective of sports activities.

The subject of the research is the persons with different disabilities from the Republic of Moldova.

Research hypotheses:

- it is assumed that the process of social inclusion of people with disabilities depends on the opportunities and resources offered by the society for carrying out sports activities;
- the more institutions / centers / sports halls will provide accessibility for people with disabilities, the more they will increase their participation in the life of society.

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1.1 Models of disability approach

Reliance and proposal of the model of approach to disability based on rights and social role valorisation based on the theory of social role valorisation (W. Wolfensberger, 2004), discrimination theory (E. Durkheim, 2002) and stigmatization theory (E. Goffman, 1990; Munteanu, 2018)

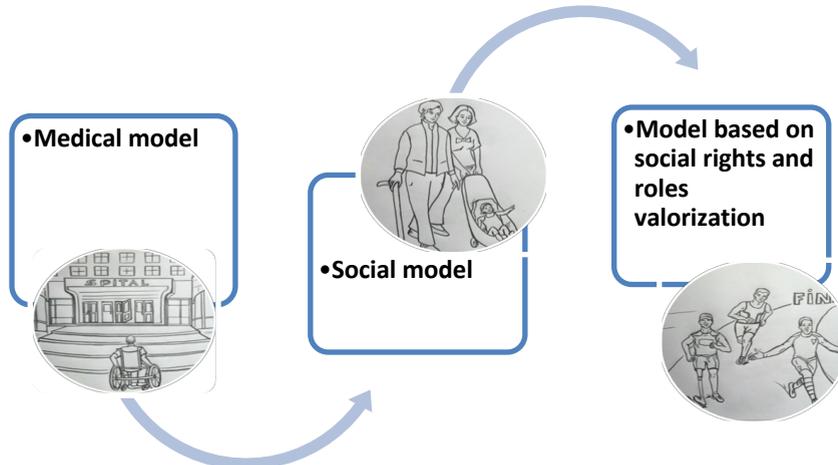


Fig.1 Models of disability approach (Munteanu,2018).

The proposed approach to disability emphasizes the need to replace the notions of "invalidity", "handicap", "special needs" with the use of the notion of "disability" both in the literature and in policy documents. This necessity comes from the fact that two terms are used in the Republic of Moldova: invalidity and disability. The concept of *invalidity* is used because it is an official one, according to the legal framework, and the concept of *disability* is used to show the importance of moving from the medical approach to the social approach. According to the study "The Analysis of the Social Protection of the Disabled in the Republic of Moldova" (Zabieta A., Malcoci L. et al., 2007), the authors recommend to the authorities to improve the social protection system by replacing the model of medical approach with the social approach of disability (Zabieta, Malcoci, 2007). The shift from the medical model of approaching the disability to the social one based on rights begins to emerge after 2010 and continues till now. The original State Report on the implementation of the Convention states that the ratification of the international treaty has laid the foundations for a substantial reform of disability in the Republic of Moldova. This process coincided with the transition from addressing people with disabilities through the medical model and social protection approach to human rights and human dignity. So far, however, there is no clarity about the model of disability approach agreed by the Republic of Moldova (Munteanu, 2018).

1.2 Funding and introducing into the science and practice of the Republic of Moldova the concept of social inclusion promoted by the European Union.

In the Republic of Moldova, similar to the CIS states, the concept of social inclusion emerged as a response to the concept of social exclusion, completing the term of insertion or social integration. Through social inclusion, local researchers defined a set of multidimensional measures and actions in the fields of social protection, employment, community living, education, health, information and communication, mobility, security, justice and culture, to combat social exclusion. In other words, social inclusion represents all measures and actions taken to ensure that all people are able to participate in society, regardless of their origin or specific characteristics, which may include: race, language, culture, gender, disability, social status, age, and other factors (Munteanu, 2018).

From the numerical point of view, as outlined in the statistical data provided by the National Bureau of Statistics (2015-2016) and the European Disability Strategy 2010-2020 adopted by the European Commission (2010) [3], the situation of persons with disabilities can be represented by the following scheme:



In the world:	<ul style="list-style-type: none"> • One billion people with disabilities • 15% of the world's population
In the European Union :	<ul style="list-style-type: none"> • 80 million people with disabilities • 10% of the EU population
In the Republic of Moldova:	<ul style="list-style-type: none"> • 182 thousand people with disabilities • 5% of the country's population

Fig. 2 Situation regarding the number of persons with disabilities (Munteanu, 2018).

2.1 The role of psychomotricity in the development of sports activities for the purpose of social inclusion

There is a less research aspect in the current economic and social context, namely interculturality in physical education and sport, starting from major changes in the contemporary cultural space. Sport is not only a physical practice, but also a cultural one, offering opportunities for knowledge and communication between people.

A predominant role in the achievement of sports activities for the purpose of social inclusion is played by psychomotricity. Psychomotricity explains the importance of motor act in somatic and mental development. Psychic and motor functions are fundamental elements of adapting the human being. Both, rudimentary at birth, evolve during childhood and develop synergistically, and then go through more and more hierarchical and differentiated integrations. Psychomotor development is the progressive acquisition of skills involving both types of activity: mental and motor.

That is why the psychomotor level of the person greatly conditions the personal efficiency (school, professional performance etc.) and, consequently, its social inclusion capacity.

Progressive differentiation leads to a strengthening of solidarity and a superior integration of the two functions (for example:

- the development of body shape and self-image;
- development of static coordination (balance) and mental qualities such as psychic balance and self-mastery;
- postural automatism and various postures and postural attitudes in nonverbal communication, etc.).

Psychomotor synergy begins to take place from birth under the influence of educational factors. In the early stages of ontogenesis, the decisive factors of psychomotor development are - along with synergistic maturation - mother-to-child ratio and socio-cultural factors.

The motor behaviour progressively develops, processual, determining the psychological development, in general, by successive and progressive integrations under the impulse of the need to organize the motor responses involved in the adaptation to the environment. The motor act is of major importance for the entire psychological development, determining (as cited by C. Păunescu, 1976) to a great extent the mental organization of the person. In the complex educational activity, psychomotor education has general formative goals: it must tend to educate the child, man, in general, through the body, considers V. Horghidan (2000) (Strategii pentru viitor, 2016).

It is a body pedagogy based on the rejection of body-spirit dualism and aims at educating the global individual. Psychomotor education aims to stimulate the normal development process (it is based on the person's resources, "strengths" in order to develop what the person can accomplish "little" or can not achieve at all) in order to promote the harmonious integration of psychomotor functions: instrumental, cognitive, symbolic, etc. Psychomotor development involves the interaction between the organization of motor responses (body movement abilities) and mental development; is the progressive acquisition of skills involving both types of activity: mental and motivational, and is therefore deeply linked to the ability of the person to adapt to the environment (natural, socio-cultural, technical) and to social, school, professional etc, inclusion.

Studies made within the project *Future Strategy, Strategies for Youth (2016)* accentuates the role of psychomotor education in child development, highlighting the fundamental unity of motricity and intelligence (especially under operative aspect). The motor act is of particular importance with regard to the genesis of intellectual operations. In this context, we recall that Pierre Parlebas (2007) considers that thinking can also be projected at psychomotor level by imposing the notion of "motor intelligence" (Strategii pentru viitor, 2016).

The psycho-pedagogical intervention at motor and psychomotor behaviour level (according to Horghidan V., 2000) has effects on the one hand for the development of the motor background itself and, on the other hand, for the development of those driving components included in the instrumental pattern necessary for the operational constructions of the other types of behaviour cognitive, verbal, affective, self-service and socializing behaviour, thus

enhancing personal efficiency (the efficiency of the activities that the person carries out) and thus also the capacity for social inclusion, (school, professional, etc.) of the person. By acting on a psychomotor level, it actually acts in the sense of developing motor behaviour, as well as on the development of synergy between organizing motor responses (body movement abilities) and the mental one (Horghidan, 2000).

Sports guidelines for people with disabilities are based on:

- sports skills, individual leanings;
- the level at which the given sport can be practiced;
- contraindications of the doctor and of each sport type;
- age, gender, topography of disability, muscle function.

Developing personality features that are favourable to social inclusion through sports games

- .is achieved through team integration and overcoming inhibition in the execution of individual tactical actions;
 - to perform individual tasks in the game;
 - work with one or more partners;
 - encourage teammates in action;
 - to perform rotation tasks involving team leadership: team captain, referee, observer, spectator, holder, substitute, self -arbitration;
- to exercise systematically exercises in the process of progressive increase of the volume, intensity and complexity of the effort made;
 - to integrate and act in teams constituted valuably;
 - to have a desire to affirm in an organized setting
 - to acquire the ability to objectively appraise their own results in relation to that of their colleagues.

Results of the study

Along with the advantages and conditions presented, the inclusive system faces a series of barriers and resistances. In this context, the major barriers to the realization and social fulfilment of people with disabilities in the society we live in are attitudes and stereotypes about their skills. People with disabilities have the need to feel efficient and competent, which is only possible if the community they live in allows them to evolve and make their own decisions.

Conclusions

Thus, in a hurried world, through education in general and through sporting activities, in particular, we can increase the acceptance of change and opening up to the other. We are following a change of attitude towards the issues and possibilities of active and effective involvement of people with disabilities in the community life, renouncing the prejudices and stereotypes that consider these persons to be completely dependent on others (unable to perform useful activities and / or services community) and the cultivation of the principle of normality which valorises in the perception of the members of the community the social and professional achievements of this category of people. We can point out that from a multitude of activities that can support the effective inclusion of people with disabilities in society, physical education and sport occupy a privileged place, as practicing this activity by members of a community gives them self-confidence, the feeling of their own identity and belonging, physical and mental health.

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Studies Regarding Quantitative Evaluation of Milk Proteins Gathered from Different Animal Breeds as Source for a Healthy Nourishment of Athletes

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Abstract

Proteins had an important role in athletes life because are the main nutrients responsible with growing and recovery of human organism structures.

The current paper presents a study on protein content of milk gathered from three animal breeds: cow, buffalo and sheep. For each type of milk was utilised a quantity of 10 L from which were realised batches each with five samples on which were determined **dry matter content** (%), **water** (%) and **protein content** (%) establishing also the content in essential amino acids (valine, isoleucine, leucine, lysine, threonine, phenylalanine) and non-essential amino acids (arginine, asparaginic acid, glutamic acid, proline, serine, etc.) (mg/100 g).

Regarding protein content calculated mean values were $3.32 \pm 0.09\%$ for cow milk, $4.06 \pm 0.05\%$ for buffalo one and $5.53 \pm 0.04\%$ for sheep milk. Amino acids as protein components represent the base for formation of muscular mass. Regarding essential amino acids from the milk analysed by us the highest vales were founded for leucine at which the means were 323.89 ± 0.11 mg/100 g for cow milk, 558.95 ± 0.11 mg/100 g for buffalo milk and 518.00 ± 0.05 mg/100 g for sheep milk. For non-essential amino acids the highest values were obtained for glutamic acid, means being 716.99 ± 0.66 mg/100 g for cow milk, 558.95 ± 0.07 mg/100 g for buffalo milk and 1164.01 ± 0.01 mg/100 g for sheep milk.

Taking in account the obtained results, we recommend athletes, and not only to them, to consume milk, because it is a complete food rich in high quality proteins and with a digestibility power of 100%.

Keywords: milk, protein, alimentation .

Introduction

Existence of all living organisms is strong connected with the exchange of materials with environment. This exchange is known as metabolism. All the vital processes as well as all the activities realised by humans during life are effectuated with some energetic expenditures (Campbell & Leidy, 2007). Elements which cover the energetic necessities could be founded in external environment and have the name of nourishment. By food it is known any product which introduced in organism serve to maintaining of vital processes, assure the growing and recovery of cells, as well as the realised activity, without to be harmful to health, but, on contrary, contribute to its fortifying (Esnouf, Russel & Bricas, 2011). Foods are composed by a series of nutritive substances or factors (Murariu Otilia Cristina, Murariu & Veleşcu, 2014).

Nourishment of athletes generally aimed to cover the energetic needs required by sportive effort and the rest of daily activities, assuring the indispensable biological support for health maintaining, obtaining the sportive efficiency and metabolically recover after effort.

Proteins are made up of hundreds or thousands of smaller units called amino acids, which are attached to one another in long chains. There are 20 different types of amino acids that can be combined to make a protein. The sequence of amino acids determines each protein's unique 3-dimensional structure and its specific function (AFSSA, 2007). So, amino acids are at the base of protein formation, being also named "bricks" from which are composed proteins. There are 25 amino acids of several types: essential (could not be synthesised by organism and must be taken from nourishment such as: leucine, isoleucine, valine, phenylalanine, methionine, threonine, tryptophan, lysine), semi-

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essential (are synthesised from essential amino acids like: cysteine, tyrosine, proline, glutamine, arginine) and non-essential (could be synthesized by organism from essential amino acids).

The amino acid composition of animal proteins is closed to the human needs; the association of different sources allows covering amino acid requirements for plant proteins. For example, cereals are generally deficient in lysine and rich in sulphur amino acids (methionine). On the other hand, pulses are poor in methionine but rich in lysine, which thus allows a good complementary. Metabolically speaking, body protein synthesis requires a good balance between all amino acids (fig. 1) (Chardigny & Walrand, 2016).

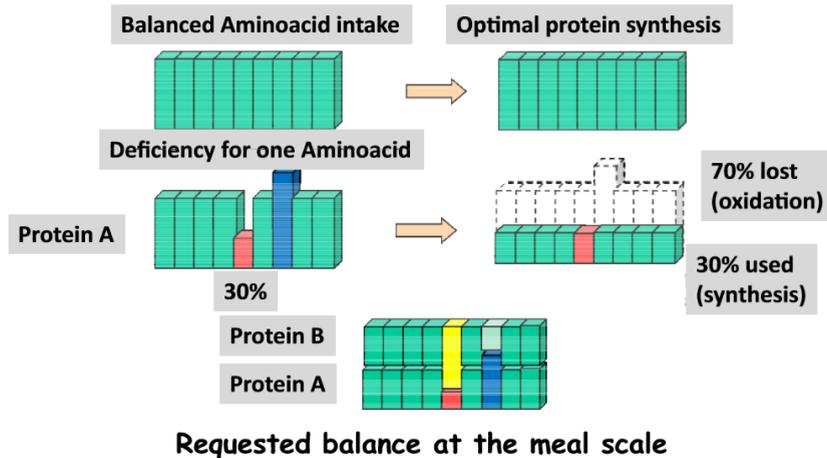


Fig. 1. Amino acid request at the meal scale (Chardigny & Walrand, 2016)

Proteins which contain amino acids are also named complete proteins and could be founded in animal origin products: carne (chicken, turkey, fish), in eggs or in dairy products (Tang & Phillips, 2009).

Proteins has been assigned the quality of "muscles' feed" still from 19th century, by Dr. Justus Freiherr von Liebig, a well-known chemist from Germany, who considered that muscles are mainly composed by those proteins, so energy of muscles is direct proportional with consumption of proteins (Tang et al., 2017; Albu, Onose, Hodorcă & Moraru, 2017). Proteins have a very important role in organism, because are utilised at construction of cells, tissues and organs (FAO/WHO, 1990). There are very important for assuring the transport of several minerals and vitamins in blood or cells. The best sources of proteins are the foods with animal origin: eggs (6-8%), milk (10-30%), light red meat (20%), fish (20%), chicken/turkey (20%) (Albu, Onose, Cărăușu & Hodorcă, 2017).

Milk presents an important role in human nourishment as well as for athletes, being an important source of nutritive factors, which are concentrated into a small volume and with a high digestibility (Murariu et al., 2013). Milk nutritive value is given by the high content in protein substances and easy assimilated fats, mineral salts of calcium, phosphorous, magnesium, sodium (Boutry, Fouillet, Mariotti, Blachier, Tomé & Bos, 2011).

Cow's milk has long been associated with good health, making it one of the most consumed beverages throughout the United States and Europe (Bos, Airinei, Mariotti, et al., 2007).

From the above mentioned reasons, in the current paper we aim to realise a study regarding protein content and the main amino acids from milk gathered from 3 important breeds.

Material and method

Biological material was represented by milk gathered from three animal breeds, as follows cow, buffalo and sheep milk. For each type of milk was used a quantity of 10 L from which were dosed in specimens of five samples on which were determined **dry matter content (%)**, **water (%)**, **protein content (%)** (total nitrogen matters) establishing also the content in essential amino acids (valine, isoleucine, leucine, lysine, threonine, phenylalanine) and non-essential amino acids (arginine, asparaginic acid, glutamic acid, proline, serine) (mg/100 g). (Doliș, Simeanu, Usturoi & Simeanu, 2017)

Dry matter substance was determined by drying oven method (STAS 6344-88). **Water content** was established by difference using the following calculus formula: **Water (%) = 100% – DM (%)** (STAS 6344-88).

Crude protein (%) (CP) resulted from total nitrogen content assessment via the Kjeldahl method, applied on a Velp Scientifica DK 6 digestion and UDK 7 distillation system (Kerese, 1984).

Quantitative determination of amino acids was effectuated in according with the method described in literature

and using high performance amino acid analyzer for the separation of amino acids, while tryptophan was colour-metrical determinate in according with the proper method (Opienska-Blauth, Charinski & Berlie, 1963; Rațu Roxana et al., 2017; Radu-Rusu, Usturoi, Leahu, Amariei, Radu-Rusu & Vacaru-Opriș, 2014).

Collected data were subjected to statistical computation, using the ANOVA one-way algorithm included in MsExcel, to calculate the descriptive statistics (mean, standard error) and find out whether there were significant differences and upgraded with PostHoc Daniel's XL Toolbox version 4.01 (<http://xltoolbox.sf.net>), to identify the differences (Hartman et al., 2007).

Discussions

Regarding milk gathered from cows, protein content recorded a mean value of $3.32 \pm 0.06\%$ minimum being 3.20% and maximum value reaching at 3.50%. Regarding studied character this one recorded a very good homogeneity, value of variation coefficient being 3.93%.

Analysis of profile in essential amino acids revealed the highest value for leucine, where the mean was $323.89 \pm 0.11 \text{ mg/100 g}$ and the lowest coefficient was founded for threonine, mean was $153.05 \pm 0.12 \text{ mg/100 g}$. The studied character presented a very good homogeneity for all essential amino acids values of variation coefficients being between 0.05% and 0.35% (tab. 1).

Table 1. Content in proteins and amino acids of COW milk

SPECIFICATION	n	$\bar{X} \pm s_x$	V%	Min.	Max.
Water (%)		87.34 ± 0.09	0.24	87.10	87.6
DM (%)	5	12.66 ± 0.09	1.64	12.40	12.90
Proteins (%)		3.32 ± 0.06	3.93	3.20	3.50
Essential amino acids (mg/100 g milk)					
Valine		190.8 ± 0.12	0.13	190.40	191.05
Isoleucine		188.99 ± 0.30	0.35	188.25	190.00
Leucine	5	323.89 ± 0.11	0.08	323.58	324.12
Lysine		260.99 ± 0.06	0.05	260.8	261.15
Threonine		153.05 ± 0.12	0.17	152.74	153.45
Phenylalanine		170.94 ± 0.11	0.14	170.60	171.20
Non-essential amino acids (mg/100 g milk)					
Arginine		121.99 ± 0.06	0.12	121.80	122.15
Asparaginic acid		217.97 ± 0.05	0.06	217.80	218.10
Glutamic acid	5	716.99 ± 0.06	0.02	716.80	717.15
Proline		302.01 ± 0.07	0.06	301.80	302.20
Serine		186.01 ± 0.06	0.08	185.85	186.20
Tirozina		183.88 ± 0.14	0.17	183.50	184.20

Analysis of non-essential amino acids profile show the highest value for glutamic acid where mean was at a level of $716.99 \pm 0.06 \text{ mg/100 g}$ and the lowest mean was founded for arginine ($121.99 \pm 0.06 \text{ mg/100 g}$).

Regarding milk gathered from buffalo, the protein level recorded a mean value of $4.06 \pm 0.05\%$ minimum being 3.90% and maximum value reaching a level of 4.17%.

Speaking about content in essential amino acids the obtained mean values for buffalo milk were higher in

comparison with the ones obtained for cow milk. So, in leucine case, the obtained mean value was 396.90 ± 0.11 mg/100 g minimum being 396.60 mg/100 g and maximum value reaching at 397.12 mg/100 g. The studied character presented a very good homogeneity for all samples, values of variation coefficients being between 0.04% and 0.10% (tab. 2).

Like in the case of essential amino acids, non-essential amino acids recorded higher values in comparison with the values obtained for cow milk, with the exception of glutamic acid, which in case of buffalo milk was founded into a quantity of 558.95 ± 0.07 mg/100 g (tab. 2).

Table 2. Content in proteins and amino acids of BUFFALO milk

SPECIFICATION	n	$\bar{X} \pm s_x$	V%	Min.	Max.
Water (%)		82.37±0.11	0.29	82.06	82.70
DM (%)	5	17.63±0.11	1.37	17.30	17.94
Proteins (%)		4.06±0.05	2.78	3.90	4.17
Essential amino acids (mg/100 g milk)					
Valine		238.91±0.11	0.10	238.60	239.15
Isoleucine		209.96±0.09	0.10	209.70	210.18
Leucine		396.90±0.11	0.06	396.60	397.12
Lysine	5	307.99±0.06	0.05	307.80	308.14
Threonine		193.96±0.06	0.07	193.78	194.16
Phenylalanine		277.01±0.05	0.04	276.89	277.15
Non-essential amino acids (mg/100 g milk)					
Arginine		128.00±0.07	0.12	127.80	128.17
Asparaginic acid		361.03±0.09	0.05	360.70	361.20
Glutamic acid		558.95±0.07	0.03	558.70	559.10
Proline	5	368.00±0.05	0.03	367.87	368.12
Serine		267.00±0.05	0.04	266.89	267.12
Tirozina		197.02±0.05	0.06	196.89	197.20

Sheep milk is the milk with the highest protein content, mean value established for proteins being $5.53 \pm 0.04\%$ with variation limits between 5.40% and 5.60%. Regarding studied character this one presented a very good homogeneity, value of variation coefficient being 1.51% (tab. 3).

Table 3. Content in proteins and amino acids of SHEEP milk

SPECIFICATION	n	$\bar{X} \pm s_x$	V%	Min.	Max.
Water (%)		80.68±0.05	0.13	80.55	80.80
DM (%)	5	19.32±0.54	0.54	19.20	19.45
Proteins (%)		5.53±0.04	1.51	5.40	5.60

Essential amino acids (mg/100 g milk)					
Valine		369.95±0.08	0.05	369.75	370.12
Isoleucine		278.00±0.05	0.04	277.89	278.12
Leucine		518.00±0.05	0.02	517.89	518.12
Lysine	5	570.96±0.04	0.02	570.89	571.11
Threonine		231.99±0.06	0.06	231.80	232.12
Phenylalanine		267.79±0.18	0.15	267.09	268.14
Non-essential amino acids (mg/100 g milk)					
Arginine		206.00±0.05	0.05	205.89	206.12
Asparaginic acid		271.19±0.19	0.15	270.80	271.90
Glutamic acid		1164.01±0.05	0.01	1136.89	1164.15
Proline	5	535.07±0.05	0.02	534.90	535.20
Serine		319.99±0.06	0.04	319.80	320.15
Tirozina		191.94±0.07	0.08	191.79	192.17

Analysis of essential amino acids revealed the highest value in lysine case, where mean was 570.96±0.04 mg/100 g minimum being 570.89 mg/100 g and maximum value being 571.11 mg/100 g. The essential amino acid founded in the lowest quantity was threonine, where mean value was 231.99±0.06 mg/100 g variation limits in this case being between 231.80 and 232.12 mg/100 g.

For profile of non-essential amino acids from sheep milk, the highest quantity was founded for glutamic acid where mean was at a level of 1164.01±0.05 mg/100 g minimum being 1136.89 mg/100 g and maximum value reaching at 1164.15 mg/100 g (tab. 3).

Conclusions

Human organism is able to synthesise only a part from amino acids, Essential amino acids which could not be directly synthesised must be introduced in organism through foods. Together with meat and eggs, milk is the food which contains all the essential and non-essential amino acids necessary for a suitable function of human organism.

At the end of analysis of protein level we observed that sheep milk recorded the highest mean value (5.53±0.04%), those one being with 2.21% higher face to cow milk and with 1.47% face to the one gathered from buffalo.

Analysis of essential amino acids profile revealed very high values for leucine, which is in a quantity of 323.89±0.1 mg/100 g in cow milk, 396.90±0.11mg/100 g in buffalo milk and 518.00±0.05 mg/100 g in the one gathered from sheep.

Also, milk contains all non-essential amino acids necessary for a good state of human organism.

We recommended milk consumption by athletes and not only, is having in view the fact that assimilation power of its components of 100%.

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Study on the Opinion of the Dance Sport Specialists Related to the Physical Training

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Abstract

In recent years, the "phenomenon" sport dance has gained a great dimension, which is certified by an extremely rich competition calendar, national and international (with competitions every week) and by the large number of legitimate athletes of the FRDS (The Romanian Federation of Dance Sport). Against this background, it is understandable that the technical requirements have increased, by permanently completing the syllabus figures corresponding to each sporting class and, implicitly, the physical ones, being known the interdependence between the different components of the training process. The idea of this study came from the findings and the observations I have made, both as an athlete and especially as a coach, according to which there is a little emphasis on the physical training of dancers in all age groups, right for which we consider that this issue should be the subject of some studies and researches. In this study, we aim to conduct a survey among sports dance specialists on the importance of the physical training and its place in the strategy of maximizing the performance capacity. In this regard, we have developed an opinion questionnaire, comprising 8 questions with response scales: "not at all", "to a lesser extent", "to a great extent", "to a very large extent". Our survey was attended by 20 coaches who received the online questionnaires and whose responses were centralized and interpreted, allowing us to draw some conclusions. We aim to demonstrate the following hypothesis: although they are aware of the importance of physical training in the complex training process, there is no rigorous concern for it among sports dancing specialists. We mention that this study is a preliminary stage of a more elaborate research that aims to demonstrate the efficiency of the rigorous physical programs that lead to the superior manifestation of the motor skills as a support for outstanding technical and artistic performances. We also want the results of our efforts to be brought to the attention of our colleagues who are active in sports dance, in order to be aware of the need for a more serious approach of the physical training of dancers.

Keywords: dance sport, physical training, specialist opinion;

Introduction

Starting from the premise that the sport performance is determined and conditioned multifactorially (besides the morfofunctional factors, being involved also those of the psychic nature) and that it represents the quintessence of the entire training activity, of optimizing the performance capacity, we are interested in this phase of our scientific concerns by the physical training as a component of the performance capacity of juniors 2, practitioners of dance sport.

A literature review does not give us much information about the methodology of training this age group, most of them are related to the adult training, and the most relevant aspects of the bibliographic studies are technical, artistic and less related to the physical component.

The objectives and the tasks of the research

Through our approach, we wanted to achieve the following goal:

- conducting a survey among the dance sport specialists, regarding the importance of physical training, the motor skills involved primarily in the specific effort of the dancing.
- In order to achieve this goal, we have set the following tasks of our research:
- the theoretical information on this issue in order to find out what has been addressed on this topic until now;
- the elaboration and the application of the questionnaire for the dance sports coaches;
- the interpretation of the answers obtained from the investigation;
- drawing up the conclusions that emerged from the analysis of the data obtained;

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The hypothesis of the research

We propose in our approach the validation of the following hypothesis:

While aware of the importance of physical training in the complex training process, there is no rigorous concern for it among the dance sports specialists.

Methods

The study of the specialized bibliography - which allowed us to read some Romanian and foreign bibliography sources in order to obtain the most relevant and up-to-date information on the subject. These sources were represented by the publications, magazines, articles, the website of the Romanian Dance Sports Federation, web pages, etc.

The pedagogical observation.

This method is based on the deliberate study of the phenomenon or the object under investigation to obtain pertinent information about it, and in the further to get a rigorous scientific analysis.

Sociological survey method

Considered an auxiliary variant of a complex research, which contributes to the completion of the data provided by the other methods, the survey uses questionnaires, interviews, conversations, gathers motivations, opinions, habits or the opinion of those questioned about the studied subject in order to know the opinions, mentalities, interests of the investigated.

In our research, we used the survey based on a questionnaire, applied to a number of 20 dance sport coaches, through which we collected data on the opinion of those questioned about the role and the place of the physical training in the complex training process.

All the questionnaires were sent by e-mail and they were received completed in the same electronic version.

The Graphic Method

The graphical representations have been used to express as efficiently as possible the processed data and the obtained results. They have also been used as a way of analyzing the research results.

Results and discussions

The survey among dance specialists was based on a questionnaire elaborated by us, comprising 8 questions, with response scales ("not at all", "to a lesser extent", "to a great extent", "to a very large extent").

In table no. 1 are presented the results obtained by applying the questionnaire for coaches, regarding the physical training.

Table 1. The results of the survey

No.	ITEM	Answers: number - %			
		Not at all	To a lesser extent	To a great extent	To a very large extent
1	Do you consider that the relationship between physical and technical training is an important indicator for the subsequent orientation of the training?	-	5 – 25%	5 – 25%	10 – 50%
2	Do you consider it important to determine the amount of the physical training (general and specific) and the volume of hours allocated in an annual cycle?	-	10 – 50%	10 – 50%	-
3	Do you think that nonspecific means (from other sport disciplines) used in physical training are the most effective?		10 – 50%	10 – 50%	
4	Do you consider that the specific means used in physical training are the most effective?		5 – 25%	15 – 75%	
5	Do you consider it important to periodically assess the level of the physical training by applying tests?			5 – 25%	15 – 75%
6	Which of the motor capacities below do you consider to be involved in dance sports?				
6.1	Speed under coordination			5 – 25%	15 – 75%
6.2	Speed under rhythmicity			5 – 25%	15 – 75%
6.3	Speed in resistance mode			10 – 50%	10 – 50%
6.4	Force under speed			5 – 25%	15 – 75%
6.5	Force under amplitude			5 – 25%	15 – 75%
6.6	Explosive force		5 – 25%	10 – 50%	5 – 25%
6.7	Force in resistance mode		15 – 75%		5 – 25%
6.8	Specific resistance		15 – 75%		5 – 25%
6.9	Resistance under force		10 – 50%	10 – 50%	
6.10	Resistance under coordination		10 – 50%	10 – 50%	

No.	ITEM	Answers: number - %			
		Not at all	To a lesser extent	To a great extent	To a very large extent
6.11	Articular mobility and muscle flexibility		15 – 75%		5 – 25%
6.12	Balance control capacity			15 – 75%	5 – 25%
6.13	Capacity of spatial-temporal orientation			15 – 75%	5 – 25%
6.14	Capacity of rhythm and tempo			15 – 75%	5 – 25%
7	Do you consider that the physical training must be geared to the specificity of effort even when the objectives follow the general physical development?		10 – 50%	5 – 25%	5 – 25%
8	Do you consider it important to carry out studies / research on the profile of the motor capacities involved in dance sports for each category?			10 – 50%	10 – 50%

To the first question, regarding the relation between physical and technical training, most of the respondents consider that this is important "to a very large extent" - 50%, the other response scales being 25% of the answers (fig.1).



Fig. 1. The graphical representation of the answers to question no. 1

Being asked whether it is important to determine the amount of the physical training (general and specific) and the volume of hours allocated to it in an annual cycle, half of the surveyed responders answered "to a lesser extent", while the remaining 50% appreciate these aspects as being "to a great extent" important (Figure 2).



Fig. 2. The graphical representation of the answers to question no. 2

The opinions of the specialists on the effectiveness of non-specific means in completing the physical training are equally divided between "to a lesser extent" and "to a great extent" (Figure 3).



Fig.3. The graphical representation of the answers to question no. 3

To the next question, 75% of our survey subjects consider as important the periodical evaluation of the physical training of dancers "to a very large extent", and the remaining 25% - "to a great extent" (Figure 4).

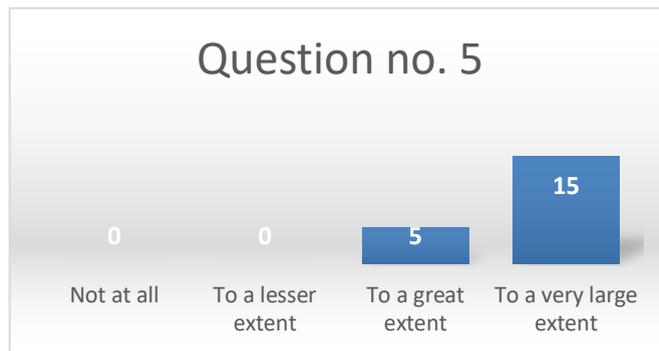


Fig.4. The graphical representation of the answers to question no. 5

Half of the participants in our survey consider that the physical training should be oriented to the specific of the effort "to a lesser extent", the other scales of appreciation meeting 25% of the answers (Figure 5).

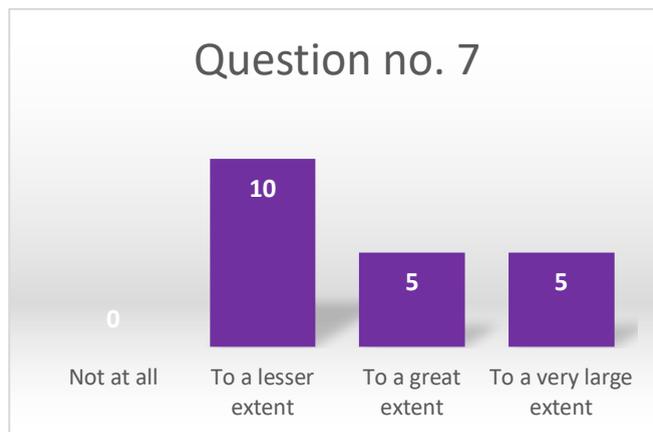


Fig.5. The graphical representation of the answers to question no. 7

When questioning whether it is important to carry out studies on the profile of motor skills involved in the dance sport, each of the two evaluation scales - "to a great extent" and "to a very large extent", has met 50% of the answers (fig.6)



Fig.6 The graphical representation of the answers to question no. 8

Conclusions

The questionnaire survey we have undertaken among the specialists has revealed that most of them believe that physical training is an important part of the training process "to a great extent". However, 50% of the coaches surveyed consider it important "to a lesser extent" to determine the amount of the physical training (general and specific) and the volume of hours allocated in an annual cycle. This only confirms a reality that we have found in so many years of coaching, namely that this component of the training process is not treated as rigorously as the technical training, which is expected to solve also the physical objectives, thus validating the hypothesis of our research.

In this context, it is not accidental the opinion of the majority (75%) of the specialists responding to our survey, which considers that the most effective means of physical training are the specific ones.

From our point of view, it is hopeful that the opinion of all the subjects of the survey is that it is important to have a regular assessment of the level of physical training, which is why we should disseminate among our colleagues, dance sport coaches, the results and the conclusions of our research on this topic. The more so as everyone has expressed their interest in such studies at the junior level as well as in the other categories of dancers.

In a top of the motor capacities that dance sports trainers consider most important in the specific effort, the top places were occupied by the speed under coordination, rhythmicity, spatial-temporal orientation, rhythm and tempo ability, less important being resistance in force mode, resistance under coordination.

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Where and Who are We and Could Be? Case Study - Romanian Sports Tourism

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Abstract

The study aims to highlight the forms of sport tourism on the different geographic and cultural regions in Romania. Depending on geographic, historical, cultural and religious resources, sports tourism activities are presented for each region. Seen as niche tourism, sports tourism gains an increasingly important place in the choice of tourists' destinations, both Romanians and foreigners. Research is based on the study of literature. A SWOT analysis is developed. The specifics of each geographical area, the use of natural resources, the cultural and historical heritage, the tourist attractions can offer a variety of sports tourism activities (active or as a spectator) throughout the year. Also, organizing some urban, but above all mountain, sporting events, gains ground. Identifying weaknesses (not enough sports and tourism infrastructure, lack of a unified database etc.) and threats (under-funding and insufficient support of policies and strategies in the field) may be prerequisites for increasing the potential of sport tourism that it generates at micro, meso- and macro-social level.

Keywords: Romanian regions, natural and cultural resources, touristic destinations, sport tourism, SWOT analysis

Introduction

Every Romanian citizen heard or uttered at least once the phrase "We have such a beautiful country and we do not know how to value it". The recognition of Romania's beauties, natural resources, as well as cultural and historical heritage has gone beyond the borders of the country. Not many people, whether simple tourists or personalities from different fields of activity, have said this through various channels of mass communication. Tourism is in continuous development, the interest of tourists to visit the country, both from residents and foreigners, is growing. (OECD, 2014, Mazilu et al., 2017, Botezat & Benea, 2012, Cosma et al., 2014, Popescu et al., 2018, Ungureanu, 2015, Pop & Coros, 2016, Surugiu et al., 2009, Postelnicu & Dabija, 2018, Turnock, 1990, Scorțe, 2011, Matei et al., 2014).

The concept of sport tourism, which brings together two areas of activity - sports and tourism - refers to the individual's action to travel actively or passively to sporting activities, occasionally or organized, and to watch sporting events (Standeven & De Knop, 1999, p. 12, Hudson, 2003, quoted by Bartoluci & Cavlek ed. 2007, p.251). Gibson (1998) establishes three directions of sports tourism: active participation, watching sporting events and visiting, and Gammon & Robinson (1997, republished in 2017) shares sports tourists into "soft" (tourists who practice recreational sports activities) and "hard" (tourists who travel with the scope to engage actively in practicing sports). Several studies have highlighted different directions in sports tourism research (Melo & Sobry, ed., 2017, Di Palma et al., 2018, Fratu, 2011, Hinch et al., 2016, Ross, 2001).

If in other countries, including Eastern Europe, the concept of sports tourism has long been implemented and valued in Romania, this segment of tourism is, in the best case, at the beginning of the race, if not in the start-up phase. If the direction of active sports tourism, by participating in various leisure time activities, seems to have an ascending trend in a more accelerated rhythm, tourism from the spectator position to various major sports events organized and hosted by different cities tends to ascend more slow. A series of studies argue the interest in several directions of sports tourism in our country (Cernaianu & Sobry, 2018, Mester et al, 2008, Chivu, 2013, Balan et al., 2014, Cozea, 2013, Pop et al. , 2016, Lazur & Ungureanu, 2014, Yilmaz & Teodor, 2018, Calina et al., 2018, Bogdan, 2018, Durbacea-Bolovan, 2013, Pintilii et al. , 2015).

Discovering Romania

According to <https://ro.wikipedia.org/wiki/Romania>, Romania is a state located in south-eastern Central Europe, with a temperate continental climate with four seasons. Since 1989, it is a semi-presidential republic, included in NATO since 2004 and in the European Union since 2007, divided into 41 counties, plus Bucharest (the capital of the

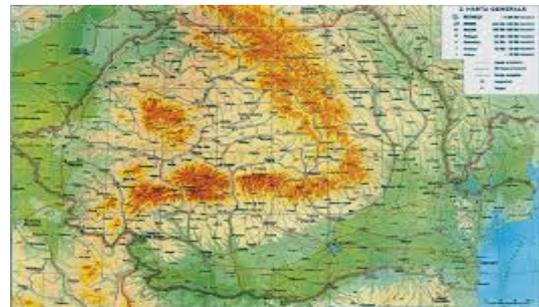
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country with 2.2 million inhabitants) in 8 regions development (Figure 1). With a population of around 20 million, the majority ethnic group consists of Romanians (89%), plus Hungarians (6,5%), Roma (3%) and other groups (1,3%). The main religious orientation is Christianity, from which Orthodox (99.3%), Roman Catholics -7%, Reformed - 3%, and 0.7% other minorities - Muslims, Jews, and Atheists). The official language is Romanian, and the national currency is Romanian Lei (RON).

The country's surface is 238,398 km², of which 3% is a water-covered area, plus 23,700 km² of the Black Sea. The varied territory consists of 35% of the mountains (Carpathians - 910 km), 35% hills and 30% plains. 14 mountain peaks are over 2000m, the highest being Moldoveanu peak (2544m). The main rivers crossing the country are: the Danube (with 29.9% of its total length), Prut, Siret (596 km), Olt (614 km), Mureș (761 km), Someș (388 km) In the southeastern part there is an opening of 245 km to the Black Sea. The lakes occupy 1.1% of the total area, the largest being Razelm (731 km²), with glacial lakes (Avrig, Bâlea, Capra) and volcanic (St. Ana, Red Lake). 13% of the total area is covered by forests.



Fig. 1 (a) Map of regions of Romania



(b) The geographical map of Romania

Sport tourism - The case of Romania

The Maramureș region is in the N-V part of the country, being part of the mountainsland, crossed by the Tisza River and its affluents. It is an important cultural center, the main tourist attractions including wonderful views, human settlements (villages, towns), nature reserves, monasteries, museums, specific traditions related to religious and secular holidays, Merry Cemetery, Mocanita, culinary traditions and folk costumes. (<http://www.visitmaramures.ro/index.php?task=category&category=geography&lg=EN#>). Sports tourism activities are mainly outdoor, some year-round or seasonal - winter sports and extreme summer sports.

The Bucovina region is the most famous area in the North of the country. Formed from mountains, hills and plains, it is the main riverside: Moldova, Bistrita, Suceava etc. is known for its monasteries (Voroneț, Sucevita, Moldovița, Humor, Arbore), traditions (eg, painting eggs and houses, carols, ceramics, food etc.), museums, fortresses (Suceava), festivals, salt mine from Cacica, etc. The spa resorts offer spas and outdoor activities: winter sports, summer sports (horseback riding, climbing, hiking, biking, off-road, water sports, airplanes etc.). (<http://www.romaniatourism.com/bucovina-moldova.html>).

The region of Moldova is a strongly influenced cultural area, with Iași being the main cultural and historical city, along with others. The hills prevail, being crossed by the large rivers Prut, Siret and their affluents. The area is known for its rich folklore, natural beauties, churches and monasteries, museums, fairs, the first university and theater in the country (in Iași), castles, festivals, vineyards, historical monuments, etc. (<http://www.romaniatourism.com/bucovina-moldova.html>). Iași was in 2012 elected European City of Sport. Indoor sports can be organized in the region (spa, sports games) and seasonal outdoor or all year round sports also.

The Dobrogea region, an ancient region, includes the Danube Delta, the Black Sea Coast with resorts, the smallest and the oldest mountains. Several ethnic minorities share the territory (Romanians, Aromanians, Greeks, Turks, Ukrainians, Lipovans, Macedonians, etc.). Museums, ancient cities, nature reserves, churches, vineyards, traditional fishing villages in the Danube Delta, seaside resorts, rock festivals, music and film can be visited. (<http://www.romaniatourism.com/dobrogea.html>). Sport tourism activities are largely seasonal, linked to the opening to the Danube and the sea.

The Muntenia region is known for the mountain ski resorts in the Prahova Valley, the spectacular mountains (Bucegi, Cozia), the Romanian Plain and the hills. Olt, Argeș, Danube, Dâmbovița are important rivers, as a number of lakes and viaducts make this region a tourist attraction: nature reserves, caves, fairs, festivals, vineyards, saline, churches and monasteries, the Transfăgărășan highway. The Bucharest Capital attracts through buildings, museums and a series of events organized throughout the year, including major sporting events (Summer Universiade 1981,

marathon since 2008, UEFA European League final in 2012), Olympic Museum (established in 1971, abolished in 1979 and reopened in 1994). It will also be held here in 2020, 3 matches in group C and one final in the European Football Championship. Prahova Valley attracts by organizing international cross-country, marathon, off-road events, extreme mountain sports. Major events were organized in 2013 - the European Youth Olympic Championship, the Carpath Cup and the FIS Cup - 2018 (male and female), the Grand Prix for Men Ski Jumping - 2018, and a nomination for Youth Olympic Games 2024. (<http://www.romaniatourism.com/walachia.html>)

Oltenia is a region crossed by the Danube, Olt, affluents, lakes. The plains, the hills and the mountains make it attractive for tourists, finding here: nature reserves, vineyards, salt mines, churches and monasteries, ancient cities, ceramics, festivals, folkloric traditions, culinary arts, modern sculpture complex from Târgu Jiu, Iron Gates etc. (<http://www.romaniatourism.com/walachia.html>)

The Banat region, in the S-V of the country, is crossed by mountains, hills and plains. Mureş, Tisa, Danube, Cerna are some big rivers. Here is also the mini-delta Balta Nera and spa resorts (Baile Herculane - ancient resort). It is an important cultural area, festivals, museums, town architecture, castles, churches as attractions for tourists, along with nature reserves (Nerei, Cerna, Retezat etc.). Sports activities can be held throughout the year or seasonally in nature (climbing, biking, hiking, fishing, caving, rafting, kayaking, canoeing etc.). (<http://www.romaniatourism.com/banat-crisana.html>)

The Crişana region, in the western part of the country, includes mountains, plains and hills. It is crossed by several rivers: Criş, Someş, Mureş, Tisa, including natural reserves, more than 100 caves, spa resorts (Baile Felix, Baile 1 Mai), vineyards. The architecture of cities (for example, Oradea), festivals, museums, churches and monasteries are tourist attractions. Besides these, outdoor activities attract tourists throughout the year or season. (<http://www.romaniatourism.com/banat-crisana.html>)

Transylvania is probably the most famous, because of the relief (mountains, plains and hills, rivers Mureş, Criş etc., natural lakes), natural reserves (Piatra Craiului, Bicz Canyon etc.), medieval towns and churches (Sibiu, Sighişoara, Braşov, Sighişoara, Făgăraş, Mediaş etc.), the castles (Bran), the multicultural heritage (festivals, folkloric traditions, culinary, painting icons on glass etc.) (Băile Tuşnad, Sovata), salt mines, Dacia fortress, town and village architecture (the most important being Cluj-Napoca, Sibiu, Brasov etc.). Sports activities include activities in nature, walking, in the air, on water, on bicycles, in caves (skiing, climbing, biking, nature walks, fishing, caving, rafting, kayaking, canoeing, etc.). (<http://www.romaniatourism.com/transylvania.html>)

SWOT analysis of sports tourism in Romania

In order to analyze the potential of sport tourism as a niche tourism, we used a management tool, SOWT analysis. With his help, I was able to highlight a number of strengths, weaknesses, opportunities and threats to sports tourism.

Strenghts

- Biological and geographical diversity (different forms of relief are encountered in each geographical area of Romania, being crossed by rivers, with specific flora and fauna) that offer multiple opportunities for sports tourism (practicing a large number of sports activities in the natural setting).
- The vast cultural heritage (each region has in its heritage a set of vestiges - fortresses, villages and towns that are also worth a number of religious and secular holidays, fairs, festivals etc.) offers the possibility that during the practice of sports tourism it can be visited and / or observed participative (can take part in different events organized in the respective places / communities).
- Extending the forms of sports tourism activities offered by tourist institutions (hoteliers, pensions, rural tourism in privat houses, etc.) and sports structures (associations, clubs, sports federations, etc.) - outdoor terrestrial activities, in and out, with and without motorized devices, etc., participation or spectator at major sports events, in cities or in the mountains, at sea or on rivers, throughout the year or seasonal. Romania entered the circuit organizing and hosting various major international sporting events - the first marathon of Bucharest in 2008, the UEFA European League final in 2012 in Bucharest, the European Winter Olympic Winter Festival 2013, the European Championships for Gymnastics and Basketball in Cluj - 2017, Carpath Cup and FIS Cup, male and female skiing, 2018, Grand Prix for male jumping, 2018 all in the Prahova Valley, cross and mountain motocross, urban and offroad rallies, etc.
- Extending the offer of services offered by hoteliers meant investments in different equipments that would allow the access of several sports activities during the stay of the tourists in the chosen holiday destinations.
- Increasing the number of social actors providing tourist services (travel agencies, hotels, boarding houses, restaurants, transportation etc.).

- Reduced costs to countries where sports tourism is developed - these relate to the purchase of the holiday package (transport, accommodation, mass), the costs of sporting activities (purchase, rent of sports equipment, hire of guides and qualified personnel etc.), entrance fees for visiting various tourist attractions in protected areas (for entry into nature reserves).
- Increasing the flow of tourists (foreign and Romanian), including the demand for tourists for sports tourism packages.
- Attract tourists to areas already known through offers that include various sporting activities.
- Increasing private or public investment that has led to the development of infrastructure, especially in known areas: hotel, boarding, transport infrastructure development, including connections between locations, building facilities (eg, sports grounds - golf grounds, marking of touristic routes for hiking, biking, motocross, the purchase of equipment and facilities for sports activities - mountain ski installations, electric bikes, light motorized or non-motorized aircraft, water equipment etc.).
- Establishing governmental and non-governmental structures that have as their object the tourism development of an area (for example creating or remarking tourist routes, vitalizing an area by identifying specific activities, organizing and hosting major sports events etc.)
- Increasing the number of qualified staff providing specialized assistance in the planning, coordination and implementation of sport tourism activities.

Weaknesses

- Reduced international visibility of tourism potential, including sports tourism, of Romania.
- Poor or insufficiently funded national, regional and local policies and strategies for tourism in Romania, implicit in sports tourism.
- Compared with other countries, the concept of sports tourism is poorly known and therefore worthless and unimplemented.
- The lack of a unitary database at local, regional, national level with sports tourism offers.
- The lack of a unitary database at local, regional, national level with infra-structure and equipment necessary for sports tourism activities.
- Insufficient promotion / advertising of packages - lack of visibility of sport tourism activities at the level of local, regional, national tourist information points (sports package offers are not sufficiently represented in leaflets, brochures, maps etc. that can be purchased from travel agencies, travel agencies, etc.) - which entails an ignorance of the opportunities that tourists have.
- Incapacity to organize large sports events (poorly developed infrastructure in several directions - international and domestic transport, including connections between destinations, insufficient sports and non-modernized sports facilities etc.).
- Absence or insufficient capitalization of the cultural-historical and natural heritage, and there are still, for various reasons, objectives that are not included in the tourist circuits.

Opportunities

- Development of tools (software, maps, guides) in international languages with the offers of sports tourism activities in Romania (by regions, cities, geographical areas, etc.).
- Vitalizing isolated or forgotten areas (including cities, for example industrial in the communist regime or villages) by organizing and hosting sporting events.
- Promotion of some sports tourism packages at national and international fairs.
- Establishing interdisciplinary higher education programs (tourism and sports) to train specialists in the field.
- Professional (re)conversion of professionals by creating sports services and programs for sports tourism.
- Development, approval and implementation of national policies and strategies, regional and local sport tourism, including through the development of public-private partnerships.
- Social and political support from local authorities for the development of sports tourism activities in accordance with the natural, historical and cultural potential.
- Cooperation in international programs with countries with experience in the field.
- Identifying sources of external financing for the development of sport tourism services.
- Changing the legislation to meet the needs, proposals of the involved partners (demand and supply on the market by tourists but also by employers, local communities etc.).

- Exploiting potential and experience in tourism by extending sport tourism as niche tourism.
- Capitalization of the image of some successful athletes from Romania for the promotion / advertising of major sporting events hosted in different locations (for example, current or former sportsmen have supported and participated in the marathon held in Bucharest, participated in opening and closing ceremonies, given prizes etc.).
- Awareness of local community members on the benefits of sports tourism investments (investments in sports tourism can generate income for both individuals and the local community, which can be reinvested, thus increasing the quality of their lives).
- Generating economic growth for the local community and / or the country (generating jobs, investment / reinvestment, infrastructure development, image creation etc.).
- Diversification and improvement of sports tourism services, including the introduction in the tourist packages of sports museums, stadiums and halls etc.
- Combining sport tourism activities with other types of tourism (medical, rural, cultural, equestrian, nautical, religious etc.) - the introduction of sports activities in the holiday package, including some bonuses.
- Access to funding programs for sports tourism activities those providing tourism services (eg, sources of funding from the European Union, and other entities of international economic cooperation).
- Promotion / advertising from local and regional government
- Identifying sources of financing and sponsorship of tourism investors to support the development of services and programs in sports tourism.
- To capitalize on the geographical and cultural-historical heritage by promoting through social media, the recommendations of the tourists who have experienced sport tourism in Romania.

Threats

- Strategic inability to create connections between organizing and hosting sporting events with sights.
- Insufficient investment from the government in infrastructure (transport in particular).
- Insufficient investment in tourist packages that included sports.
- Insufficient promotion of tourism in Romania, including sports tourism.
- Poor legislation in tourism.
- Short links between actors involved in the services offered (hotels-local authorities-tourists).
- Low visibility of bidding at the stakeholder level (offers with packages of sports tourism activities are insufficiently promoted at fairs, local information points or even at the hotel, boarding house, Rescue Service on Mountain - Salvamont service etc.).
- Lack of sporting bases to current standards that will generate potential candidates for organizing and hosting major international sporting events (for example, we are late with the stadium and railway infrastructure chart for hosted competitions in the 2020 European Football Championship).

Conclusions

Romania gains a step-by-step identity in the international tourism market, including sports tourism.

The diversity of opportunities offered by nature and cultural and historical heritage are factors that determine tourists' choices to visit the various regions (urban or rural, mountainous or marine) of the country. The offer of services and programs in sports tourism, active or passive, organizing and hosting large sports events, as well as visiting various sports tourist attractions, pulsates Romania's potential as a chosen tourist destination.

Several aspects show that Romania has taken important steps in the development of sport tourism. Also, identify and implement policies and strategies in the field that can turn negative aspects into direct and indirect benefits at individual, community and national level.

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The Mirage of Testosterone

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Abstract

Background: Testosterone is both an endogenous hormone and a drug of abuse. In addition to their androgenic effects, testosterone also have anabolic actions on muscle mass, being advertised as an physical performance enhancer, anti-obesity and anti-aging supplement, capable of improving libido and vitality.

Aim: To increase the awareness of testosterone doping risks in bodybuilders.

Material and methods: Two amateur bodybuilders, aged 29 years, agreed to participate in a 30 days comparative study. One subject was self-administered testosterone, despite investigators advice. At baseline and at the end of the study the subject was evaluated using a physical and emotional state questionnaire, body composition, physical performance, arterial stiffness and blood tests. Both subjects had similar body composition characteristics and follow the same training protocol (>80% of one-repetition maximum - 1RM) during the study period.

Results: The study investigators did not provide and encouraged the usage of testosterone drug. Comparative results after 30 days of study favours the testosterone user regarding: skeletal muscle mass (+5.8%), lower limbs explosive power (+36.2%), 1 RM chest press (+6.2%) and 1 RM back squat (+7.4%), body fat percent (-0.8%), and visceral fat area (-22%). The negative consequences mentioned after 30 days by the testosterone user were: sleep disturbances, feeling nervous and agitated, increasing appetite and skin paraesthesia. We also measured an increase of pulse pressure with 44%, along with 293% increase of blood testosterone. Most of the negative effects were still present in a follow up evaluation at 30 days after study ended.

Conclusions: Despite improvements in body composition, muscular mass and muscle performance, one-month administration of testosterone may result in mood, sleep and endocrine disturbances and increase of pulse pressure and cardiovascular risk.

Keywords: bodybuilding, doping, testosteron

Introduction

Testosterone is both an endogenous hormone and a drug of abuse. In addition to their androgenic effects, testosterone also have anabolic actions on muscle mass, being advertised as an physical performance enhancer, anti-obesity and anti-aging supplement, capable of improving libido and vitality.

Nowadays, scandals related to testosterone derivatives or androgenic anabolic steroids (AAS) abuse in the world of competitive sport are not unusual.

Analyzing historical data, the interest of athletes to improve their physical performance, seems to be as old as sport itself. Dried figs and mushrooms, were used as early as BC 776 by the the Greek Olympians in order to improve performance (Sandberg, 2016).

The first publications regarding the use of testosterone, date back to 1896 when the austrian physiologist Oskar Zoth, published his paper regarding *how one could potentially improve athletic performance with the use of an "extract"*. Oskar Zoth was the first person to propose injecting athletes with a hormonal substance (Sandberg, 2016).

1936 is related to be the year when Testosterone propionate was synthesized and appeared in sport industry sometime after the 1948 at the Olympic Games (Yesalis and Bahrke, 2002)

Metandienone, is an androgen and anabolic steroid (AAS) and was first developed in 1955 by a Swiss multinational pharmaceutical company. It apeard on the marked as Dianabol (1958, United States) and Turinabol (East Germany, after 1966) and marked the beginning of the "virilization" of modern sport. (Llewellyn W., 2011).

The effects of this substance have been long debated over time in medical scientific communities. Most of the time the debates concerned the effects of testosterone on cardiovascular (CV) health. The results of the studies on this topic were among the most varied and controversial. While some studies showed the devastating effects that testosterone administration may have on the cardiovascular system, other studies reported cardioprotective effect of testosterone

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and led to significant increases (12-fold globally) in prescriptions between 2000 and 2011 in 41 countries. (Elagizi,2018)

Differences in study results can be induced by multiple confounding variables.

AAS are abused in sports and bodybuilding and they may have not only the desired effect, but also adverse side effects related to overdose, the combination of different AASs with other drugs and administration for long periods.

Testosterone use is still a tabu subject, and for this reason, dosage, safe administration period, and proper measures for post cycle periods, are unknown. These parameters can not be studied respecting the ethic code of medical research, but there is an obvious need for studies to draw attention to the problem of testosterone use and abuse. (Sandberg, 2016)

This study aims to increase the awareness of testosterone doping risks in amateur bodybuilders.

Material and methods:

Two amateur bodybuilders, aged 29 years, agreed to participate in a 30 days comparative study. Despite investigators advice, one of the two subjects was self-administered testosterone (TT).

At baseline and at the end of the study the subjects were evaluated regarding body composition, physical performance, and blood tests but we also used a physical and emotional state questionnaire in order to find possible effects from area. This questionnaire was created by the research team and is not a standardised questionnaire. For the physical performance we used 1RM test for chest press and squat and Myotest performance measuring system (Switzerland) for lower body muscle performance using a Counter movement jump test (3 repetition). We registered the mean height, power and force values. (Table 1 and Table 2.)

For the body composition evaluation, we used InBody 720 (Korea) for recording skeletal muscle mass (SMM), percentage of body fat (PBF), bone mineral content (BMC) and visceral fat area (VFA).

At the beginning of the study, both subjects had similar body composition characteristics (Table 3.) For this one week of study, both subjects follow the same training protocol which consisted in 4 times a week strength training (load >80% of one-repetition maximum - 1RM). From the blood tests, we track the changes of total testosterone (Table 4.).

At the beginning and at the end of the study, we also measured blood pressure with an automatic Omron M3 Comfort blood pressure cuff, and used the mean value of the measurements at each arm to calculate the pulse pressure value (PP) subtracting the diastolic pressure (DP) from the systolic pressure (SP) (Table 4.).

All the parameters above mentioned were followed up after 6 weeks from the end of the study. In this 6 weeks the two participants maintained the same training protocols but the testosterone user did not continue the testosterone self-administration.

The testosterone user declared that he used Pharma Test PH100 Testosterone Phenylpropionate (Pharmacom Labs) 300 mg/week and Drostanolone (Pharmacom Labs) 450mg/week. The study investigators did not provide and did not encourage the usage of testosterone but even discouraged the use of these substances by familiarizing the subject with the side effects.

In the tables below we used the initials of the subject: V.S.-the testosterone user and M.V.-control subject. Data were analysed using GraphPad Prism graphing and statistics software. Absolute values but also the percentage differences between tests are represented on the graphs.

Table 1. Lower body physical performance parameters evolution (Myotest-CMJ)

	CJM Height (cm)_1	CJM Height (cm)_2	CJM Height (cm)_3	CJM Power w/kg_1	CJM Power w/kg_2	CJM Power w/kg_3	CJM Force N/kg_1	CJM Force N/kg_2	CJM Force N/kg_3
V.S.	36,6	44,5	44,7	44,2	63	67	21,6	29,3	31,3
M.V.	25,1	27,7	29,1	31,3	33,3	35	18,3	20,9	22

CMJ Height - Jump height at Counter Movement Jump test ;CMJ Power-Lower limbs power at Counter Movement Jump test; CMJ Force-Lower limbs force at Counter Movement Jump test (1-first evaluation; 2-second evaluation; 3-after 6 weeks after the final of the study)

Table 2. 1RM test

	1 RM Chest press(kg)_1	1 RM Chest press(kg)_2	1 RM Chest press(kg)_3	1 RM Squat(kg)_1	1 RM Squat(kg)_2	1 RM Squat(kg)_3
V.S.	125	140	140	155	175	180
M.V.	85	90	92,5	90	95	95

1 RM Chest press-One-repetition maximum Chest press test; 1 RM Squat-One-repetition maximum Squat test (1-first evaluation; 2-second evaluation; 3-after 6 weeks after the final of the study)

Table 3. Body composition characteristics evolution

	BMC(kg) 1	BMC(kg) 2	BMC(kg) 3	SMM(kg) 1	SMM(kg) 2	SMM(kg) 3
V.S.	4,2	4,48	4,36	45	49,5	50,1
M.V.	3,51	3,61	3,63	35,5	37	37,5
	PBF% 1	PBF % 2	PBF %3	VFA 1	VFA 2	VFA 3
V.S.	11,5	10	7,3	66	44,1	44,1
M.V.	19,4	18,7	18,1	81,9	72,8	71

BMC-Bone mineral content; SMM-Skeletal muscle mass; PBF-percentage of body fat; VFA-visceral fatt area
(1-first evaluation; 2-second evaluation; 3-after 6 weeks after the final of the study)

Table 4. Total testosterone and pulse pressure evolution

	Testosterone (ng/ml)_1	Testosterone (ng/ml)_2	Testosterone (ng/ml)_3	Puls pressure (mm Hg) 1	Puls pressure (mm Hg) 2	Puls pressure (mm Hg) 3
V.S	3,15	12,4	0,25	47	67	52
M.V.	4,9	4,55	4,85	34	42	38

(1-first evaluation; 2-second evaluation; 3-after 6 weeks after the final of the study)

Results and discussions:

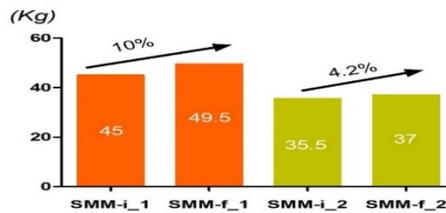
The main results after 6 weeks of study are summarised in the tabel below (Tabel 5.):

Table 5. The main changes regarding the physical condition of the two subjects

	V.S. initial	V.S. final	Diferences	M.V. initial	M.V. final	Diferences
SMM (kg)	45	49.5	+4.5	35.5	37	+1.5
PBF %	11.5	10	-1.5	19.4	18.7	-0.7
BMC	4.2	4.48	+0.28	3.51	3.61	+0.10
Lower limbs Power (wat/kg)	44.2	63	+19.2	31.3	33.3	+2.0
Upper limbs power (kg)	125	140	+15	85	90	+5
Testosterone (ng/ml)	3.15	12.40	+9.25	4.90	4.55	-0.35
PP (mm Hg)	47	67	+20	34	42	+8

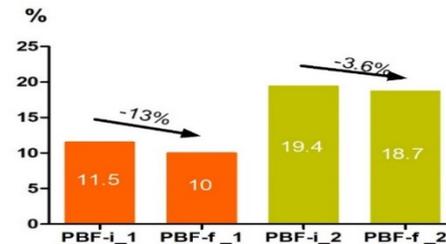
SMM-skeletal muscle mass; PBF-percentage of body fatt; BMC-Bone mineral conten, PP-pulse presure

Comparative results after 30 days of study favours the testosterone user regarding the body composition parameters: skeletal muscle mass (with an increase of 10% versus an increase of just 4.2%), body fat percent (with a 0.8%greater deccreas), bone mineral content (6.6 % increase versus 2.8%) and visceral fat area (with a 22% greater decrease). (Fig. 1-4)



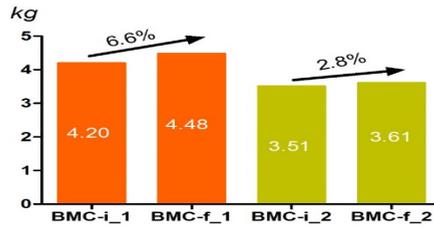
(i-initial; f-final; 1-subject 1-TT user; 2-subject 2-nonuser)

Figure 1. Skeletal muscle mass evolution

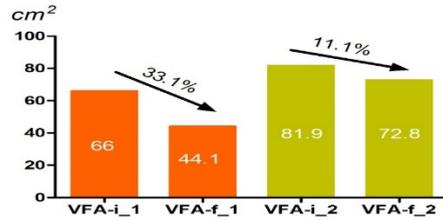


(i-initial; f-final; 1-subject 1-TT user; 2-subject 2-nonuser)

Figure 2. Percentage of body fatt evolution

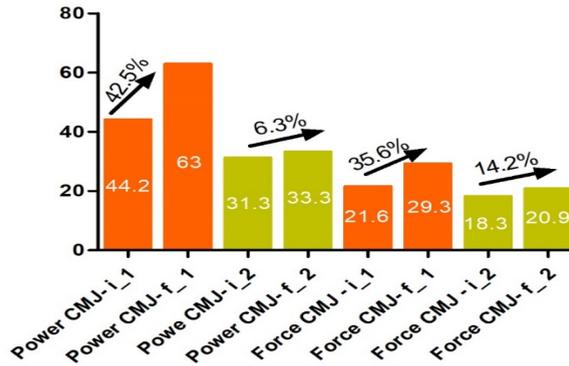


(i-initial; f-final; 1-subject 1-TT user; 2-subject 2-nonuser)
Figure 3. Bone mineral content evolution

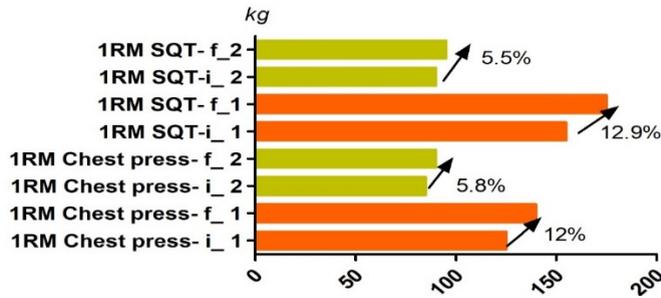


(i-initial; f-final; 1-subject 1-TT user; 2-subject 2-nonuser)
Figure 4. Visceral fat area evolution

The testosterone user also had better results regarding muscular performance parameters. Lower limbs force increased with 35.6% in the testosterone user and just 14.2% for the control subject. This trend is observed also for the lower limbs explosive power (tested with Myotest), with a 36.2% greater increases, 1 RM chest press with a 6.2% greater increase and 1 RM back squat with a 7.4% greater increase. (Fig.5,6)



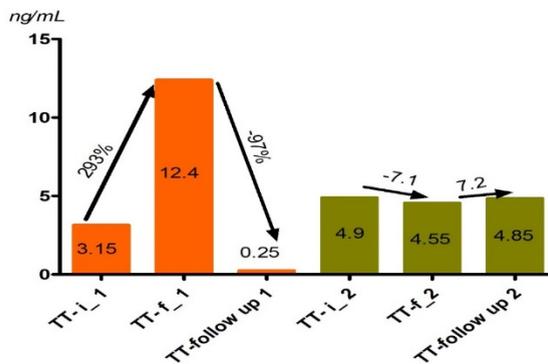
(i-initial; f-final; 1-subject 1-TT user; 2-subject 2-nonuser)
Figure 5. Lower limbs power and force evolution



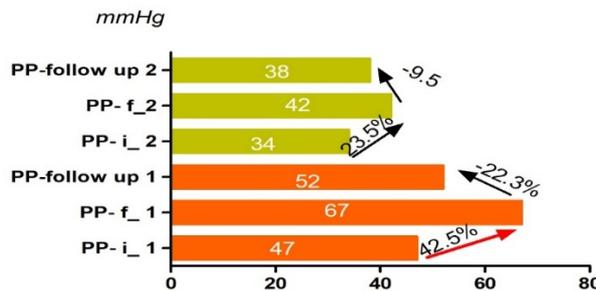
(i-initial; f-final; 1-subject 1-TT user; 2-subject 2-nonuser)
Figure 6. 1RM Power evolution

The negative consequences mentioned after 30 days by the testosterone user were: sleep disturbances, feeling nervous and agitated, increasing appetite and skin paraesthesia.

We also observed an increase of pulse pressure with 42.5%, along with 293% increase of blood testosterone in the testosterone user. The puls pressure also increased in the control subject (+23.5%) but the testosterone level decreased (-7.1%).(Fig.7,8)



(i-initial; f-final; follow up-after 6 weeks after the study ended; 1-subject 1-TT user; 2-subject 2-nonuser)
Figure 7. Total Testosterone levels evolution



(i-initial; f-final; follow up-after 6 weeks after the study ended; 1-subject 1-TT user; 2-subject 2-nonuser)
Figure 8. Puls Pressure evolution

The bad news for the testosterone user was that the PP increased above the normal range.

Recent studies evaluated the hypothesis that PP could be a good indicator for the cardiovascular risk assessment. It is known that lately PP is considered to be an independent cardiovascular risk factor, high pulse pressures (> 60 mm Hg) being associated with higher cardiovascular morbidity and mortality rates. (Blacher, Staessen, Girerd, et al., 2000; Panagiotakos, Kromhout, Menotti, et al., 2005)

Other sources describe as normal value for pulse pressure, for young adults, approximately 40 mm Hg. (Homan, 2018). Our results show that after just 1 month of testosterone use the PP increased from 47 to 67, and this value could include the subject in the risk zone.

It has been shown that strength training can lead to low arterial compliance and high PP. (Bertovic et al., 1999)

The PP value increase may be an effect of the strength training but the increase was much higher for the TT user (from 47 to 67 mm Hg versus 34 to 42 mm Hg for the control subject).

Most of the negative effects were still present in the follow up evaluation at 30 days after the study ended. 1 month after testosterone cessation, the subject had an increased PP value (52 mm Hg). On the other hand, the testosterone value registered a significant decrease reaching 0.25 ng/ml while in the case of the non-user, a slight increase of testosterone level, maybe due to the strength training, can be observed. (Fig.8) This result may not be present in the TT user because TT administration is known to decrease self TT production and is needed a Post Cycle Therapy in order to re-establishing self-testosterone production of the body.

Cardiovascular risk seems to increase with PP even if the result on this topic are sometimes different between studies. ESH/ESC guideline from 2013 proposed as a safe threshold for PP 60 mm Hg, but this value is 10 mm Hg higher than the 2007 guideline recommendations with no clear justification. (Aparicio et al., 2014)

Most of the AAS users experience at least one minor side effect, including acne (40-54%), testicular atrophy (40-51%), gynecomastia (10-34%). Similar to our study, other studies present the fact that male subjects can experience: increased or decreased of the sexual drive, increased body hair or loss of head hair, sleeplessness, increased irritability and sometimes depressive mood, increased appetite, enhanced transpiration, and gynecomastia.

The most common cardiovascular consequences of AAS include atherosclerosis (secondary to changes in cholesterol metabolism and platelet function), hypertension, cardiac hypertrophy, impaired cardiac function, and sudden death.

Chronic AAS use theoretically enhances hepatic triglyceride lipase activity and can increase the risk of cardiac disease. Acute myocardial infarction is the most common event presented in studies, but other adverse cardiovascular effects such as left ventricular hypertrophy, reduced left ventricular function, arterial thrombosis, vasospasm, myocarditis, pulmonary embolism, myocardial fibrosis, a direct myocardial injury and several cases of sudden cardiac death have also been reported. (Sandberg, 2016)

Conclusions

Despite the improvements regarding body composition, muscular mass and muscle performance, one-month administration of testosterone may result in mood, sleep and endocrine disturbances and can lead to an increase of the cardiovascular risk inducing a long time maintenance of the increased PP value (still present after 6 weeks after administration cessation).

Additional studies are needed to ascertain whether the side effects occurring in the testosterone user are transient and if so what is the length of time needed for them to return to normal.

Behind all apparently positive aspects of testosterone use, there is an increased risk of adverse events and permanent or transient changes that may alter the health of users.

We will continue this study in order to find out if the risk associated with the increased PP is reversible and how much time is needed for these parameters (PP and TT) to reach normal values again (values measured at the beginning of the study).

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New Statistical Methods of Analysis of the Volleyball Game (ProVBallStat 1.0)

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Abstract

In modern sports winning is conditioned by giving the attention to every detail. From eating to rest, from physical training to tactical training, from correcting your own mistakes to capitalizing on those of your opponents and, last but not least, effectively capitalizing on team strengths.

Thus, it is essential to correctly set these strengths and to timely correct errors in team play. That is why we can say that in modern sports, statistics are a must-do.

Achieving correct and effective statistics is crucial to the success of a team. Therefore, the monitored and quantified parameters should be chosen carefully so that they are as representative as possible for both the team and the individual athletes, to include as many determinants as possible in sport performance.

Keywords: Excel, reports, efficiency, success

Introduction

In modern sports winning is conditioned by giving the attention to every detail. From eating to rest, from physical training to tactical training, from correcting your own mistakes to capitalizing on those of your opponents and, last but not least, effectively capitalizing on team strengths.

Thus, it is essential to correctly set these strengths and to timely correct errors in team play. That is why we can say that in modern sports, statistics are a must-do.

Achieving correct and effective statistics is crucial to the success of a team. Therefore, the monitored and quantified parameters should be chosen carefully so that they are as representative as possible for both the team and the individual athletes, to include as many determinants as possible in sport performance.

We can enumerate as follows:

- Physical factors;
- technical factors;
- tactical factors.
- Physical order factors are related to the physical fitness of the athlete and resistance to effort. These can be quantified by various methods such as time / speed, effort, fingerprint, amplitude, etc.
- Technical factors are the ability of the athlete to correctly achieve a method and performance, such as a success rate of an attack from the total number of attempts.
- Tactical factors are first and foremost the correct approach to an opponent's game, but above all adherence to the coach's instructions, observation of the opponent's tactic in real time, and adaptation of the game to the observed ones.

In this sense, it is essential to collect accurate statistics and to interpret the coach correctly to improve team results. In an ideal model, the coach cooperates with his technical team, including the statistician, who has a great responsibility to accurately record statistics and achieve the necessary reports as effectively as possible.

In this paper we want to detail the proposal for a statistical evaluation compatible with the second and third stages as the procedure coincides and only the moment of analysis and implementation differs. We will stop at volleyball, a spectacular sport we want to promote and help in this and attract more practitioners, especially in the performance segment. Many teams in the lower or junior echelons refrain from turning to this mode of analysis for several reasons. The main cause would be the financial one, the other would be coaches who think that training after "old school" is

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the key to success, but not to omit the coaches who consider statistic a waste of time or simply ignore it from convenience.

It is the duty of every person involved in the volleyball phenomenon to contribute to improving the image of this sport, attracting more practitioners, increasing the selection area, naturally ensuring the competitiveness and competition within a team and, implicitly, the quality of the game. The role of statistics is to bring the team up, to turn it into a successful one. As we are pursuing success models today, the winning teams will always attract the "eyes" of the young, future aspirants, practitioners, and the stars of the 6-zone field.

The emergence of baseball statistics seemed utopian in its time, welcomed the reluctance of traditional coaches, but secured the success of those bold, open, visionary and confident in this analysis. Let's not forget that football is now investing a lot in quantifying all the parameters of the athletes, from the physical to the technical ones and tactics, factors that are essential elements in setting up an ideal team and a tactical game.

The proposed version is primarily ergonomic, inexpensive, accessible to anyone, but can show that using it can change team play and even the fate of a party.

The statistical model implies a more detailed analysis of each phase than existing classical models so that the degree of accuracy in the evaluation of a player or team is as high as possible.

The statistical evaluation is divided into 5 phases of play as follows:

- Service
- Receiving
- Passing
- Attack
- Blocking

Since the classic model with +, -, or zero can be far too detailed, we propose a quantification model divided by 6 levels of efficiency (0%, 20%, 40%, 60%, 80%, 100%), specific to each type of action.

These can also be followed by the action of the opposing setter as well as the predilection at work and attack by the opponent.

• **Serving**

Our own service is the way to easy construction of a point, the first step towards challenging your opponent.

0% - wrong service;

20% - service from which you can take a good pass. The lifter has all the combinations options;

40% - action where the advantage of the team at work is less than the advantage of the receiving team. Taking over the service is far from the net but at which the pass arrive at the setter but can not play quickly or in combination;

60% - the service that retains the benefit of receiving. The ball does not reach the setter, but the other player;

80% - a service that takes the ball to be directly to the service's own land or is taken in very difficult conditions and makes a mistake in the next succession of actions;

100% - Ace - Direct point or error when taking over.

• **Receiving**

The important stage of the volleyball game, the defense phase is the basis for preserving the advantage or returning to the game, and besides blocking the correct receiving is the key to a winning attack construction.

Efficiency assessment is structured as follows:

0% - direct error or Ace to the adverse service;

20% - Direct take-over to the opponent or in-game mistake;

40% - the setter can not to play the ball. Passing is done by another player;

60% - the receiving ball is far from the setter, which can only play for safety (high pass, L II etc.);

80% - the receiving ball that reaches the setter zone but which lacks a parameter (time, space, etc.), which gives the setter only 2 finishing options (no attack at time 1);

100% - Accurate receiving at the pass, which has to reach certain characteristics (trajectory, height, etc.) depending on the tactic set.

• **Setting**

Finding a setter to synchronize with the shooters, ensuring the optimal attack effectiveness of the team, is a delicate step in the scouting process and the monitoring of their effectiveness is considered by some coaches to be the most complex statistical process taking into account the range of action of these lifts.

In a primary processing of efficiency this is divided as follows:

- 0% - missed / causing a direct strike of the opponent;
- 20% - low pass at which the shooter has limited options to continue or is forced to pass the ball simply over the net;
- 40% - high-pass back to which the shooter is unable to properly prepare his attack;
- 60% - pass in the area of the shooter but in the net;
- 80% - pass to which the shooter moves but remains with all the attack options;
- 100% - high clearance on the shooter area, ideal for attack.

• Attack

- The essential process of obtaining points by the team is quantified as follows:
- 0% - wrong attack (the point is lost directly);
 - 20% - the ball reaches the setter that has all the options for attack or returns from the block in the initial pitch and makes a mistake in succession;
 - 40% - the ball from dig reaches the setter, but he can not play time one or the ball returns from the difficult block that can only keep the game away without attacking (just passing the ball over the net);
 - 60% - the ball from dig does not reach the setter, reaches another player or the ball returns to the attack ground (blocking, digging) under difficult conditions from which only safety can be built;
 - 80% - the attack causes a mistake in the sequence of actions or the ball returns to the attack ground in very good conditions for the attacking team or the attacking dig ball comes directly to the field where the initial attack was carried out;
 - 100% - direct point or misconduct of the opponent (consequence - becomes point).

• Blocking

- It represents the first stage of digging in countering attacks and is an essential part in achieving effective defense. We propose a standardization to quantify its effectiveness as follows:
- 0% - a mistake that interrupts the game (block-out, touching a tab, etc.);
 - 20% - favors the receiving ball of the adverse team so that the setter has all the options or the ball returns to the blocking ground and makes a mistake in succession;
 - 40% - the dig is made from the ground from which the block was made, the ball reaches the setter but can only play high or pass the ball over;
 - 60% - the ball is in the blocking area and does not allow the setter to reach the ball (can only build safety);
 - 80% - the ball returns to the attacking ground and makes a mistake in the action sequence or stays in the blocking ground under good receiving conditions (the ball touches the block and is easily recovered);
 - 100% - achieve the direct point.

• Monitor the actions of the opponent setter

The opponent's setter statistical monitoring is an essential stage in a match and the "reading" of the passing, decrypting the mode of action can be the key to winning a match. This monitoring phase is a complex process involving many parameters and fineness / speed in observation.

A first monitoring method is that of the attack frequency in the six areas of the ground depending on the passage area on the net. So for quantification, the net is divided into 9 equal areas, numbered from left to right, starting with opponent's zone 2 as exemplified in Figure 1:

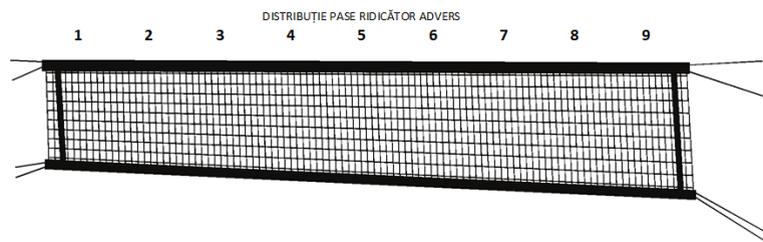


Figure 1

Another proposition of a statistical report is that of the tabular area from which the attack is made and the height / type of passing. Thus, in this report, besides the 9 areas of the net we add 5 "zones" of height, namely:

- 1 - short pass on the center (spike);
- 2 - high pass on the first shooter;
- 3 - low pass on the distant shooter (second);
- 4 - high pass on the distant shooter (second);
- 5 pass on the back.

An example of reports is shown in Figure 2.

This example helps us to infer that the adverse attacks in this case are predominantly from area 9 of the net, suggesting an increased attention to the blockage in zone 2. Also following the second report, corroborated with the first, we can deduce that the attacks were built in most cases by receiving from area 6, 4th type high pass.

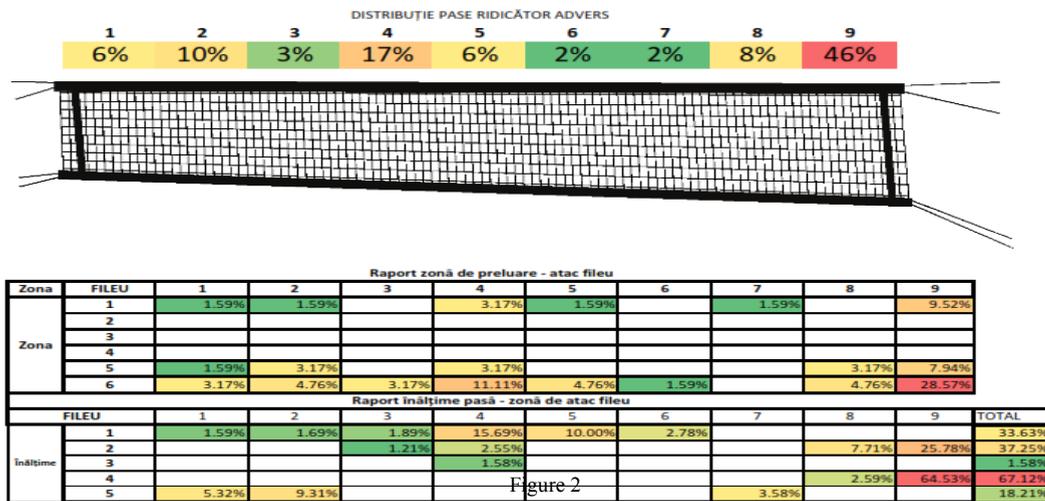


Figure 2

At any time of the match, statistics data can be consulted by the coach, being a dynamic condition, helping to make decisions to change the game in an efficient manner, as shown in Figure 3:

NR	Serviciu					Preluare (P)					ATAC					Blocaj (B)					Paseuri (W)					Puncte scor	GENERAL									
	1	0.0	0.1	0.4	0.2	0	1	0.0	0.0	0.4	0.2	0	1	0.0	0.0	0.4	0.2	0	1	0.0	0.0	0.4	0.2	0	1			0.0	0.0	0.4	0.2	0				
1	0	1	2	2	1	0	50.00%	0	0	0	0	0	100.00%	0	0	0	0	0	#DIV/0!	1	0	1	0	0	0	33.33%	12	10	7	4	3	1	58.21%			
17	6	2	3	1	1	1	73.43%	4	0	0	0	1	2	80.00%	5	2	1	4	3	3	49.00%	0	0	0	0	0	0	0.00%	0	0	0	0	0	0	31	43.11%
13	2	2	3	0	0	3	94.00%	11	4	3	3	4	8	35.76%	12	3	2	1	5	8	34.84%	0	0	0	0	0	0	0.00%	0	0	0	0	0	0	34	34.87%
4	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	10.00%
7	3	0	1	4	0	3	52.50%	11	1	0	2	0	80.00%	1	0	1	1	1	1	44.00%	1	1	1	0	3	40.00%	0	0	0	0	0	0	4	49.13%		
20	0	0	0	0	0	0	#DIV/0!	10	4	0	4	5	36.00%	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	36.00%	
9	1	0	0	1	0	0	28.00%	0	1	0	2	1	72.00%	3	2	1	0	2	2	36.00%	0	1	0	0	1	3	14.29%	0	0	0	0	0	0	4	42.57%	
10	0	0	0	0	0	1	0.00%	0	0	1	0	3	5	13.33%	0	0	0	0	0	0	20.00%	0	0	0	0	0	0	#DIV/0!	0	0	0	0	0	0	0	16.67%
11	0	2	3	0	0	0	80.00%	0	0	0	0	1	1	30.00%	0	0	0	0	0	0	#DIV/0!	0	1	0	0	0	1	48.67%	8	10	4	10	1	3	0	63.15%
12	1	1	1	1	1	2	60.00%	4	4	0	2	4	4	47.37%	1	0	0	4	2	2	43.43%	0	0	1	0	0	0	30.00%	0	0	0	0	0	0	8	43.21%
TOTAL	34	30	0	0	2	11	36.43%	37	15	11	0	24	24	32.79%	24	7	5	10	17	16	30.63%	2	5	4	1	1	27	28.43%	20	20	11	24	4	4	40	

Figure 3

In this case we have highlighted the libero players with yellow and the blue setters to make it easier to view and compare the data.

This statistic encompasses all phases of the game to give a more relevant idea of what is going on in the field and the decisions taken to help and be in line with the real aspect of the game.

It also highlights the direct points made by each player and per team, the difference being the errors of the opponent. Taking into account the displayed reports and the fact that they are a team that lost the match by 3-0, the first 2 sets at 22 and 20 at first glance, seeing the statistics we can conclude that a general average of the team increased by 10% would have secured the victory.

The proposed statistical model is easy to use, talking here on a computational scheme and recorded in spread sheet applications and addressing low budget teams, such as the lower leagues of the national divisions, and the junior teams that want to progress.

We see here, for example, quite a lot of service errors. This may suggest a coach to pay more attention to this stage of the game this week. By tracking and training each stage of the game, the statistical module can lead the team to much better parameters and change a defeat with a victory.

The defeated team had a 61% blocking error, which meant that it was not used efficiently. Given that 46% of the attacks were made on zone 9 of the net and if this had been reported in time by a statistician, it is very likely that a concealment of the blockage in that area, the coach assuming a controlled risk, could lead to the inclination of the balance in the favor of their own team.

Conclusions

There are many teams that use identical training or the like, and therefore in modern sports any detail treated with the utmost attention can make a difference between a 23-25 and a 25-23. It is not enough just a "hard workout" to be sure of a "solid" presence in the field. A good method of training nowadays must correlate modern techniques with each player's progress stats, individual work on the elements. The analysis of real-time, as pointed out, directed to constructive tactical changes, can actually put a technical superior adversary into difficulty or physical. Finding breaks is essential to becoming a successful coach or a "good coaching".

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Benefits of Salin Aerosols in Improving the Quality of Life

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Abstract

The direct influence of air pollution on human health causes a number of changes in the body of the exposed person as a result of their contact with various atmospheric pollutants. Most of the time, the direct action of air pollution is the result of the interaction of several pollutants present at the same time in the atmosphere and only rarely the action of a single pollutant.

We aim to highlight the benefits of saline aerosols in environmentally friendly environments.

Key words: health, wellness, pollution, saltmine.

Introduction

The most representative pollutants in the atmosphere, according to some authors (Ciulache, 1980, 1998; Farcas, 1990 and 1999) are:

- Irritating pollutants: - in the form of dusts, sediments or suspensions acting on the airways, and even if they have mechanisms to protect against the harmful effects of pollutants such as mucus, ciliary epithelium, etc., may be affected by inflammation, rhinitis, pharyngitis, laryngitis, bronchitis etc.; sulfur oxides occur in the atmosphere due to combustion of fossil fuels or various industrial processes and cause respiratory irritation: excess salivation, expectoration, spasms and breathing difficulties that lead to the occurrence of chronic bronchitis; nitrogen oxides as well as sulfur oxides have a blocking effect on the movements of bronchial and tracheal airway epithelial cells and interact with the hemoglobin at the blood level resulting in methemoglobin that prevents the transport of respiratory gases (oxygen) to the tissues; oxidative (ozonide) substances generated by ultraviolet radiation on hydrocarbon products have respiratory irritant effects (Erhan, 1999);

- Pollutants with asphyxiating action: - Carbon dioxide as a result of incomplete combustion and in combination with hemoglobin generates carboxy-hemoglobin, this influences the amount of oxygen or its deficiency in the atmosphere, with the most serious consequences on the respiration mechanism of different tissues, and cells, manifested clinically by headaches, dizziness, drowsiness, nausea, arrhythmias (Căluianu, 1999);

Pollutants with systemic toxic action: Lead is released into the atmosphere in the form of vapors and can penetrate the human body in two ways: the more dangerous the respiratory pathway, because it reaches directly into the blood and the digestive tract. Lead exerts its harmful action in the blood, favoring the occurrence of anemia, and in the nervous system causes a negative gap of intellectual development in children (Ciplea L., I. and Ciplea Al., 1978);

- Pollutants with fibrous action: powders, especially those with high density, fix themselves to the lung and cause a decrease in pulmonary elasticity as a reaction to a foreign body with new tissue formation around, favoring the appearance of fibrosis;

- Carcinogenic pollutants such as aromatic polycyclic hydrocarbons, ie organic pollutants, resulting from incomplete combustion of solid and liquid fuels, can cause destabilizing reactions in the body under prolonged exposure (Junge, 1974);

- Pollutants with allergic action: Mineral or organic powders, gases (nitrogen oxides, sulfur, carbon) or volatile substances from insecticides, detergents, plastics, drugs can produce in the respiratory system: acute rhinitis, tracheitis, asthma various inflammations, then eye manifestations (conjunctivitis and blepharitis) or cutaneous (eczema, urticaria etc.) (Fărcaș, 1990);

- Pollutants with infectious action: contamination caused by pathogens in the atmosphere is responsible for a large number of diseases because the majority of germs that cause the occurrence of various infectious and contagious

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diseases have respiratory pathways (diphtheria, scarlet fever, convulsive cough, measles, rubella, varicella, smallpox, flu, guttural).

Salt aerosols from the seas and oceans play an extremely important role, and their density and cyclicity can even influence climate change. Saline aerosols found in atmospheric layers can neutralize most acids and harmful substances emitted into the atmosphere, through polluting activities or even volcanic eruptions. The amount of saline aerosols determines the degree of atmospheric nebulosity, so as the amount of saline aerosol is higher (to the optimum) in the air, it becomes even clearer and can be seen as clearly as possible. The higher the pollution and the emanations of gases, the lower the density of these saline aerosols, because they combine and diminish quantitatively, directly causing a sharp decrease in atmospheric and, implicitly, air quality (Krasnoshtein, 1995; Laskin et al., 2003).

Lately, the important development of the pharmaceutical industry and industrial drug production has led to excessive use of drug treatments to mitigate the evolution of various diseases. Ease of use, availability, and relatively rapid therapeutical effect have set the priority in choosing drug therapy to alleviate symptoms (Alfoldy et al., 2002)

However, at the same time as the therapeutic effect, drugs can cause various pathological conditions, which are determined by their side effects, and most allergic conditions and autoimmune processes are caused by drugs. In addition, drug treatment also causes a process of destabilizing the body's defense mechanisms.

For these reasons, physicians have decided to return to the use of natural environmental factors, treat disease, and conduct various investigations to find the best treatment methods without using only the drugs (Abdulaev et al., 1993; Basir, 1995; Bauer, 2004).

Halotherapy ("halos" in Greek means salt) is one of these methods of prevention and treatment representing the alternative way of treating respiratory diseases in a controlled saline aerosol environment that simulates the existing microclimate in a saline (Monah et al., 2007, 2008).

Treatment in natural saline (speleotherapy) has been known a long time ago. Miners and other people involved in these activities may have been aware of the beneficial effects that salt mining has on their health, long before they were described in a book published by a doctor Polish in 1843 (Skulimowski, 1968, Ştirbu et al., 2012).

The effectiveness of speleotherapy is associated with the unique cave microclimate, sodium chloride aerosols are the main curative factor, they are formed by convective diffusion from the salt walls. A number of other factors such as the relatively constant temperature, the humidity regime, the almost total absence of pathogens and allergens also help to increase the therapeutic effect (Mera. O. and Mera, D., T., 2010; Mera et al., 2012).

The therapeutic effect of natural mines and caves is given by the set of physical, chemical and biological factors that manifest themselves as a whole, causing various effects on the human body. During the course of therapy and prevention, there are a number of factors influencing the functioning of the body: the high degree of air purity, the absence of allergens in the cave and saline microclimate (the number of allergenic particles in the city exceeds 1000pcs / cm³, caves and saline falls below 100pcs / cm³), then humidity and constant temperature, low airflow velocity, high negative ionization, very low ozone (Enache et al., 2011a and 2012).

Being considered an extremely simple and attractive therapy process for both children and adults, halotherapy can be easily accomplished, does not involve the administration of medication, dietary supplements, bedding, or a strict diet. The process is accomplished both by inhalation of saline aerosols in the airways and by absorption through the skin (Enache, 2011b; Crişan, 2011a; Barnea, 1978).

The absorption of aerosols in the respiratory system intensifies a series of actions: disinfection, fluidization of mucous membranes, elimination of toxins, restoration of cell membrane elasticity, reduction of pH at the surface of organs involved in breathing, etc.

The exposure of human subjects to the halotherapeutic atmosphere has no contraindications, under the prescribed conditions of exploitation, but it is still necessary to know the level of physical development of the subject and his state of health:

- for healthy or seemingly healthy people, an exposure of the body to the saline atmosphere of about 30min / day is beneficial for maintaining a physically and mentally positive tone;
- To obtain results in preventing and then mineralizing the body, a cure for 12-18 days, 30min / day which can be cyclically repeated, about one month or whenever necessary;
- for treating mild cold - as a complementary treatment, between 30 and 60 minutes / day for at least 12 days;
- for asthmatics, depending on the degree of disease manifestation and health, between 1-4 hours / day, a 14-21 day time cycle, which can be cyclically repeated, with a rest period of about 14 days or times whenever needed;
- for various respiratory conditions, depending on their degree of manifestation, between 30-60min and 2-4 hours / day, a 14-21 day cure;
- in preventive belts, especially during periods of season change, when the body is prone to disease, between 30-60min / day for at least 12 days;

- remineralization of the body, maintenance, relaxation, restoration and prevention, between 30-60min./day, whenever possible but minimum 30min / day) (Fennelly, 2004, 2012; www.saline.ro).

Therapy in natural or artificial halochambers has the following beneficial effects:

- Improvement of expectoration due to increased volume of sputum and secretions in the upper respiratory tract - which leads to improvement of the respiratory act and the patient's feeling of release, pulmonary release, which also has the effect of increasing cough productivity;
- obtaining in time the bacteriostatic effect by reducing episodes of recurrent respiratory infections or completely eliminating acute seasonal episodes (it is beneficial for COPD patients with whom an episode of acute respiratory infection may be fatal);
- improving the quality of sleep by diminishing the edema of the upper aerodigestive branch (palatine vein, tongue base, tonsil louse piles) often found in those affected by snoring (Chiruță et al., 2008).

The composition of natural salt (gemstone or halite salt) also enters other inorganic substances that participate in the normalization of the most important physiological processes of the body, its mineralization and hydration, the effects of halotherapy having a broad spectrum:

- iodine is necessary for the body because it interferes with the normal activity of the thyroid gland and the proper functioning of the digestive processes;
- magnesium has an important role in preventing allergic reactions, being necessary for: assimilation of vitamins, normal functioning of the muscles and nerves, stabilization of the heart rate and blood sugar level etc .;
- calcium has a basic role in the formation of bone and muscle tissue, being responsible for blood clotting; • Iron is needed to remove toxins from the body and transport oxygen, entering hemoglobin prevents anemia and increases immunity;
- Potassium improves metabolic processes and helps regulate water balance in cells;
- Sulfur has a basic role in immunological processes and is absolutely necessary for albumin synthesis;
- sodium controls blood pressure and plays an important role in maintaining the body's acid-base balance;
- selenium prevents the free radical destruction of cells and helps regulate the activity of the thyroid gland;
- lithium reduces the level of chemicals in the body, causing a number of behavioral and irritability disorders;
- Manganese has an important role in the health of skin, bones and cartilage.

Halotherapy has a beneficial effect in combination with chromotherapy and audiototherapy (especially in the case of nerve sufferings), the colors and the musical background, creating a climate of good mood for both children and adults (Avram, 2009).

Halotherapy has also shown its efficacy in pediatrics, given that in Romania we do not have enough clinical data to demonstrate scientifically the benefits of halotherapy in children, Prof. Dr. M. Leichsenring of the Ulm Pediatric Hospital in Germany has conducted a study on 133 patients aged 4 to 10 years diagnosed with bronchial asthma. At the end of the study, the German professor concluded that although the spirometry results did not show a spectacular improvement, the quality of life of patients reflected by the quality of the respiratory act was significantly improved - they stated in the study questionnaire that saline aerosols had greatly relieved their breathing. At the same time, between 3 and 6 months, Professor M. Leichsenring's conclusions were that the group of patients receiving halotherapy did not develop major seasonal viral / bacterial infections (Antoniou et al., 2007 a and b; Crișan, 2011c; Yang et al., 2008).

In the therapeutic environment loaded with saline aerosols a beneficial effect on the body also have physical activities carried out in order to maintain or restore health. Exercise exercises have an important impact in increasing the ventilation power of the respiratory system (increasing the amplitude of respiratory movements while decreasing their frequency), improving the functional capacity of the circulatory system due to the strengthening of the heart. Strengthening the heart leads to better blood irrigation of the tissues, a process that results in better oxygenation of the body, with an important role in preventing ischemia of any kind, primarily cardiac and cerebral, lowering cholesterol deposits, attracting energy into the body fat surplus, obesity control, dynamic elimination of toxins (Avram, 2009; Borundel, 1995; Brega et al., 2009; Dumitrescu et al., 2012). Physical activities also have an impact on the increase in blood levels of hormones, which produces an acceleration of metabolism, stimulates growth processes in children, improves muscle mass, diminishes the effects of osteoporosis, especially in the adult population, activates insulin secretions, and prevents the occurrence of diabetes. The systematic practice of physical exercise leads to the slowing of aging, the movement influencing the number of free radicals, the invisible rust that grinds tissues and organs. The dynamics of metabolism, the decrease of protein loss and the connective structures and the amplification of cell regeneration processes have the effect of reducing oxidative processes (combining free radicals with oxygen and forming aggressive compounds), limiting wear processes, destabilizing beneficial reactions at the cellular level (Avram, 2009).

In addition to increasing resistance to stress, the movement also has a number of psychological advantages, such as: improving concentration, emotional stability, creating a good overall comfort (due to increased blood levels, dopamine, norepinephrine, and of other neurotransmitters) (Avram, 2009; Giannuzzi et al., 2003). A person with a very good physical and mental state is able to better bear the illnesses, the annoyances, the effects of internal and external aggressive agents (Dobrescu and Petrovai, 2004; Gil, 2004).

Maintaining health depends on us, on our will and wisdom, on the degree of culture and civilization, on how we organize our lives, how rational we are. In each case, living conditions are not the cause of illness, but ignoring the most basic rules of organizing activity, rest, and life in general. The lack of discipline at work, the disorganization, lead to depletion of the physiological mechanisms of adaptation, over time leading to overwhelming, early aging, to chronic diseases that are very difficult to treat (Ffion, 2008; Sinițchi, 1995).

The guarantee of a healthy and long life is reflected in a well-formed and respected lifestyle, with fewer abuses. Health is the most valuable asset that enables man to use his physical, mental and emotional potential to his full capacity, with the goal of fully achieving personal aspirations and family within the society in which he lives and works.

Conclusions

Regarding the current state of knowledge about saline aerosol applications in therapy and environmental enrichment, a series of conclusions can be drawn as follows:

- Pollutants in the atmosphere that stay for a long time in the environment, at minimum or maximum doses, primarily affect the respiratory apparatus, and the effect of pollutants on population health has a different impact on toxicity, concentration and duration exposure or stationary;
- The direct influence of air pollution on children's health is highlighted primarily in the morpho-structural and anatomical and functional changes that result from the action of various atmospheric pollutants present concurrently in the form of aerosols and solid or liquid microparticles and rarely under the action of alone pollutant;
- By their density and cyclicity, saline aerosols from sea and ocean waters affect climate change, interact with most harmful substances emitted in the atmosphere as a result of natural or anthropogenic pollutant activity that determines the degree of atmospheric nebulosity;
- Halotherapy is considered in the literature as a complementary method, but also an alternative way of protecting the airways, as it contributes to increasing the resistance of the human body to aggressive atmospheric phenomena, by the negative influence of gases and solid or liquid microparticles in the air, success over a wide range of conditions and thus diminishing long-term medical treatment;
- The beneficial effects, according to the literature, of halotherapy are: improving the expectoration due to the increase of sputum volume and secretions in the upper respiratory tract, which leads to improvement of the respiratory act; timing of the bacteriostatic effect by reducing episodes of recurrent respiratory infections or complete elimination of seasonal episodes, improving the quality of sleep by diminishing edema of the upper aerodynamic pathway;
- One of the important effects of halotherapy, highlighted by the latest research in the field, is to increase the efficiency of expectoration, which leads to improvement of the respiratory act and the feeling of "well-being" of the patient through the release and pulmonary release;
- Constantly using halotherapy can provide effective prophylaxis for both children and young people who live or work in crowded urban environments, in heavily polluted or enclosed areas, but also for other human subjects, especially for people who, for various reasons (time or financial) cannot reach a natural salt mine.

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Comparative Study Between the Vertical Detachment of One Foot and the Vertical Detachment of Both Feet with One Step and Two Steps Take-Off Approach

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Abstract

This work proposes to study the relationship between the possible differences between the vertical detachment of one leg with one step and three steps take-off, but also the vertical detachment of both feet with one step and three steps take-off. The efficiency of the vertical detachment is very important for achieving success in male but also female volleyball.

The vertical detachment values were measured and compared with a one-step pitch for one foot detachment and the detachment from both legs, as well as the detachment from one foot and both with one-step and three-step elbows.

As a result of the indices obtained and compared, the effects on the vertical detachment have indicated an increase in the maximum point reached with one arm behind the one step take-off and respectively 3 steps.

Keywords: volleyball, one leg take-off, jump efficiency

Introduction

The attack is the most influential skill specific to volleyball after which one can predict the success of the team Palao, J. M., Santos, J. A., & Ureña, A., after (Cox 1973). The technical process called the strike for attack is composed of the following phases: take-off, beating, flight, hitting the ball and landing

The take-off represents the contact that the player has with the game surface, by an accelerated stepping, first steps being nearby, and the last wider step, executed with high speed precursory to the beat Tarchilă N., and Şerban M. (1975). The beat is the contact with the game surface according to Poenar A., (2006), which can be achieved by the player at the same time, or simultaneously, in which case the contact of the soles to the ground is carried out in a short period of time one after the other.

The flight is performed as high as possible vertically, the body and the arms should be relaxed Tarchilă N., and Şerban M., (1975), and the balance of the arms transfers the energy from the horizontal direction to the vertical direction and raises the body in the air.

Hitting the ball shall be carried out from top to bottom, with the arm stretched and the elbow joint locked in the highest point reached. The landing according to Tarchilă N., and Şerban M. (1975), is carried out on the tip of both feet as balanced as possible and the body facing the direction of the attack, contact with the game surface being tip-heel and heel-tip.

The vertical expansion or detachment within volleyball game is very important. The vertical detachment is achieved by the propulsion of the body into the air and reaching the highest possible point, with one arm, in the case of the attack, or both arms in the case of the blockage. The expansion means the ability which allows a sports player a full acceleration of its body towards an object or a partner Bubanj S., Stankovic R., Bubanj R, Dimic A., Bednarik J., Kolar E. (2010).

The height of the vertical detachment is a very important variable in evaluating the different sports categories, which requires the ability of jumping in different situations depending on the specific sport request Piucco T, Santos SG (2009).

In the case of volleyball performing a vertical detachment jump is associated with the sportsman's performance, being a decision-making factor in the effectiveness of the completion Piucco T, Santos S.G.(2009). The underlying factors of the upper vertical detachment may depend on the quality and speed of the take-off, the development degree of the basic motor qualities and the development degree of the motor qualities specific to the sports branch. The most

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pregnant motor qualities in the volleyball game are speed and force, both in their basic form and in the regime of the other motor qualities

In general, speciality literature studies have highlighted the fact that vertical detachment depends on the speed of the take-off that is precursory to the detachment.

Soest, A.J. van, Roebroek, M.E., Bobbert, M.F., Huijing, P.A., & Schenau, G.J. van. (1985) compared the performances of the vertical detachment of one and both feet on a number of 10 professional volleyball players. All tests have been carried out on the spot from semi-squat without an additional arm swing. The upper values being recorded at the detachment of one leg, contrary to expectations.

Saunders, H.L. (1980) investigated the effects produced by the vertical detachment of one leg and of both legs preceded by take-off. The survey was carried out on a number of 3 volleyball players and three basketball players, superior results being obtained with for the vertical detachment of one leg with take-off.

Healy, J. (1977) emphasizes the upper differences obtained at the vertical detachment with one step and three steps take-off compared to the vertical detachment executed out on the spot.

Detachment from one leg benefits from take-off from the free leg at the moment of the impulse in the game surface of the opposite leg, the free leg. Vint P.F and Hinrichs R.N (1996).

Kayambashi, K. (1977), shows the differences obtained at the three and for steps take-off compared with the vertical detachment on the spot. Higher values differences in favour of the vertical detachment after performing the take-off.

Methods

A number of 19 players, advanced, with the mean age of 17 ±1 year members of the junior and cadets team from Dej town participated as volunteers for the conduct of the study. The duration of the study concerned a cycle (four weeks) of accommodation and training. The objective which we have pursued in this period was the formation of the ability to vertically detach of one leg.

For the transition from the detachment of both legs to the detachment of one leg we used exercises and methods specific to athletics, of the jumping school.

The participants were informed about the trials they were about to participate to:

- vertical jump, with one step take-off, bilateral detachment with reach of the highest point, with one arm - attack take-off, jumping and reaching the highest possible with stretched arm.
- vertical jump, with one step take-off, unilateral detachment with reach of the highest point, with one hand - attack take-off, jumping and reaching the highest possible with stretched arm.
- vertical jump, with three steps take-off, detachment of both legs with reach of the highest point, with one hand - attack take-off, jumping and reaching the highest possible with stretched arm.
- Vertical jump, with three steps take-off, detachment of one leg with reach of the highest point, with one hand - attack take-off, jumping and reaching the highest possible with stretched arm.

Once the body was ready for effort, each participant performed a number of three repetitions for each trial, recording its best values.

Results

Table no. 1, shows the means of the values obtained at the trials with a score of 297 cm the mean of the performances for the one step take-off with bilateral detachment and 301,50 cm the mean of the performances for the one step take-off with unilateral detachment. Thus recording a difference of 4.5 cm in favour of the vertical detachment of one leg.

Table 1. Values recorded at the detachment with one step take-off

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	bilat. 1 step take-off	297,00	20	12,397	2,772
	unilat. 1 step take-off	301,50	20	12,314	2,753

Table 2 shows the mean of the values recorded at the trial of the three steps take-off with detachment of both legs. Difference of 5.5 cm in favour of the detachment of one leg.

Table 2. Values recorded at the detachment with three steps take-off

		Mean	N	Std. Deviation	Std. Error Mean
Pair 2	Bilat 3 steps take-off	308,50	20	14,288	3,195
	Unilat. 3 steps take-off	314,00	20	14,164	3,167

Both Table 1 and Table 2 shows the recorded values of the trials, those in favour of the detachment of one leg being superior.

Using the Independence T-Test we have compared the data to highlight the difference of the means obtained, which shows us a positive score for the take-off with detachment of one leg in both cases lower than 0.05. From this we can conclude that the results are not accidental but a consequence of the proper application of the technical-tactical means in order to acquire the one-leg detachment take-off.

Table 3. Independence T-Test 1 step take-off, degree of meaning

		N	Correlation	Sig.
Pair 1	Bilat. 1 step take-off unilat. 1 step take-off	20	,999	,000

Table 4. Independence T-Test three steps take-off, degree of meaning.

		N	Correlation	Sig.
Pair 2	Bilat. 3 steps tak-off & unilat. 3 steps take-off	20	,999	,000

Table 5. Jump index used by F.R.V

Name initial letter	Jump indices		Values of the F.R.V indices	
	unilaterally	bilaterally		
B.R	0,84	0,8	1.00	Very good
B.S	0,81	0,76	0.95	
B.M	0,9	0,86	0.90	
C.D	1,06	1,02	0.85	
C.I	0,79	0,75	0.80	
C.A	0,86	0,81	0.75	Well
C.T	0,86	0,82	0.70	
C.M	0,78	0,74	0.65	
C.V	1,15	1,12	0.60	
H.M	0,94	0,9	0.55	
M.L	1,12	1,06	0.50	Sufficient
M.S	0,84	0,79	0.45	
M.C	0,92	0,88	0.40	
P.C	0,56	0,52	0.35	
P.R	1,35	1,31	0.30	
P.O	0,81	0,76	0.25	Insufficient.
T.S	0,43	0,4	0.20	
T.R	0,64	0,59	0.15	
U.A	0,71	0,67	0.10	
V.A	1,2	1,15	0.05	

Table 5 shows the results of the jump index, index used by R.V.F. To calculate the jump, index the F.R.V. proposes the following formula:

$$Jump\ index = [(height/height\ of\ the\ net) \times (jump\ on\ the\ spot\ with\ 2\ hands - height\ of\ the\ net + jump\ with\ take-off\ with\ one\ hand - height\ of\ the\ net)] / 100.$$

Using this formula, we also calculated the jump index for the three steps take-off with one hand, unilateral and bilateral detachment. The difference of the jump indices obtained was 0.043 in favour of the three steps take-off

unilaterally. The mean of the indices computed for the three steps take-off with bilateral detachment being 0.8355, and for the one with unilateral detachment being 0.8785.

For a more precise differentiation we have split the results offered by the R.V.F. into four categories: insufficient (I) ranging between 0.05-0.25, sufficiently (S) with values 0.30-0.50, well (W) ranging between 0.55-0.75 and very well (VW) 0.80-1.

The values obtained are presented as follows:

(a) the values of the three steps take-off with bilateral detachment have been centralized as follows: I-0 positions, S- 2 positions, W- 7 positions and VW- 11 positions.

(b) the values of the three steps take-off with unilateral detachment have been centralized as follows: I- 0 positions, S- 1 positions, W- 5 positions, VW- 14 positions.

Following the centralization of the jump indices referred to at lett. a) and b) we can see an increase of the positions in the upper category (VW), with three more units for the three steps take-off with unilateral detachment

Table 6. Values of the expansion et on one step and three steps take-off

Initial letter of the name	Height with stretched arm	expansion			
		unilat. 1 step take-off	unilat. 3 steps take-off	bilat. 1 step take-off	bilat. 3 steps take-off
B.R	248	50	62	46	57
B.S	239	51	67	56	61
B.M	247	57	71	53	66
C.D	254	58	71	53	65
C.I	243	55	65	51	60
C.A	245	56	64	51	58
C.T	244	59	71	55	66
C.M	242	56	64	51	58
C.V	249	71	86	67	81
H.M	252	53	64	48	58
M.L	246	68	87	64	82
M.S	249	49	61	44	55
M.C	245	59	77	55	72
P.C	238	43	51	38	45
P.R	261	63	79	59	74
P.O	239	58	77	53	71
T.S	231	44	57	40	52
T.R	233	55	68	50	62
U.A	240	52	62	48	57
V.A	255	63	76	58	70

We calculated the motor quality the combined with the force in the speed regime by differentiating the values obtained in the vertical detachment tests and the height the player reaches with the arm stretched.

In order to highlight if the values obtained are significant and not a chance we used the Independence T-test to compare the data. Table no. 8 and Table no. 9 show the values obtained, and for both cases the significance index is less than 0.005 which means that the

results obtained are significant. Table no. 1 shows the recorded values of the trials, those in favour of the detachment of one leg being superior.

Table 7 Significance test for the one step take-off

	N	Correlation	Sig.
Pair 1 unilat. 1 step take-off & bilat. 1 step take-off	20	,953	,000

Table . 8 Significance test for the three steps take-off

		N	Correlation	Sig.
Pair 1	unilat. 3 steps take-off	20	,999	,000
	bilat. 3 steps take-off			

Chart 1 The mean of the values recorded when measuring the vertical detachment, three steps take-off

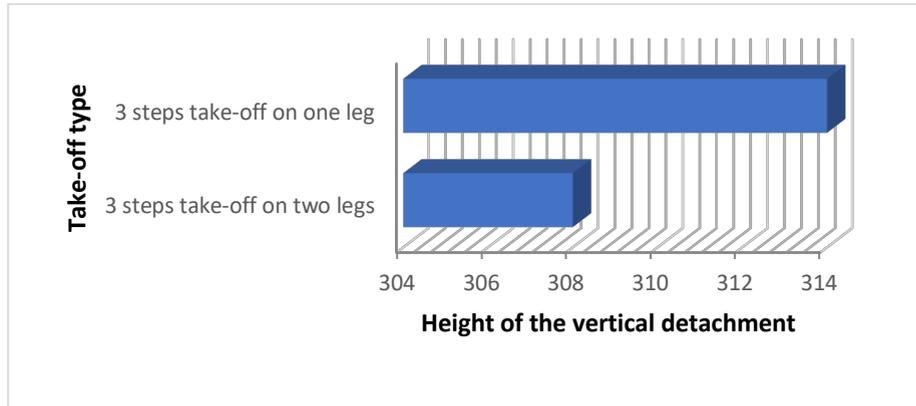
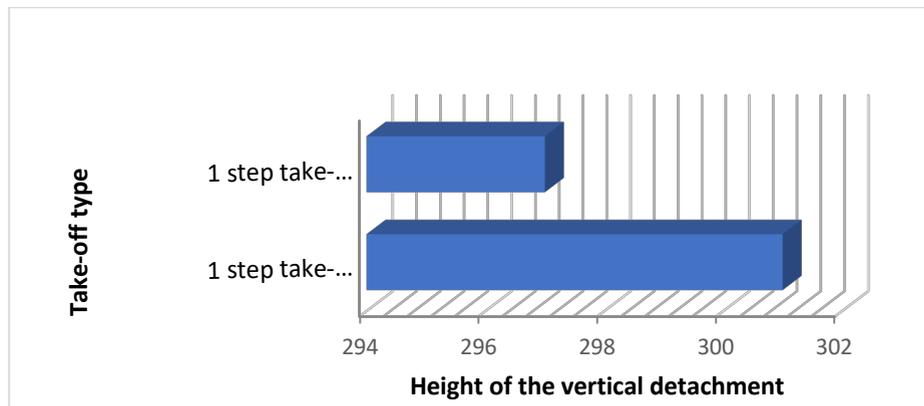


Chart 2 The mean of the values recorded when measuring the vertical detachment, one step take-off.



Conclusions

Our research purpose was to analyse and highlight differences between the classic take-off, of three steps with detachment of both feet and the one proposed by us, with detachment of one leg.

Within the framework of the game actions, performing a jump with vertical detachment with superior jump indices is associated as a decision-making factor in the efficiency of offensive phases in attack and winning the point.

In volleyball, the execution of a higher vertical jump is associated with the performance of the athlete being a decision-making factor in the effectiveness of the attack. Therefore, getting a higher point in attack can lead to multiple possibilities in getting points

A higher vertical jump gives the player a better attack angle to make a decisive attack and achieve the p.

The results obtained in the measurements made illustrate significant differences as regards the use of the take-off with detachment of one leg compared with the one with detachment of both legs. Therefore, we can say that by using the take-off with detachment of one leg the players will obtain indices that are superior in terms of the attack point height both at the one step take-off and the three steps take-off.

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Movement Games - Formative Valences Which Lead to the Development of Coordination Abilities in Primary School Pupils

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Abstract

The following paper has the aim to present a part from a more ample research whose purpose was to apply games that involve movement for the primary school children in order to improve the index of performance for the general motor skills. In the paper, there are presented the registered results in order to develop these motor skills. The experiment was performed in a rural environment throughout the 2017-2018 school year and involved 96 students from the primary level, specifically the third and fourth grade. Ten games which provide handiness were predominantly used. For each class were used two games in order to develop the mentioned skills. The results were varying. The statistics showed better results for the group including girls rather than the boys' group. The experimental girls' group obtained a significant progress to three from the four trials ($p < 0,001$) whereas the boys' group obtained significant results for three from the four tested trials. The experiment demonstrated that games involving movement can represent an efficient alternative for the traditional lessons in the primary school for the learning system in Romania.

Keywords: physical education, primary level, handiness, movement games, motor skills

Introduction

Physical education improves students' confidence, their concentration and communication skills allowing them to become healthy active and responsible citizens. The physical education and sport curriculum should be diversified and brought up-to-date by using different environments such as terrestrial, aquatic, airy and also interior and exterior environments (Rus, 2013; Ungureanu-Dobre et al., 2014; Bădău, 2018).

In the primary learning system, the Physical education and sport subject is an instrument of the didactic process that uses the physical exercise as a means of developing (educating) particularly the motor qualities and generally, the motor skills. The influences of the physical exercises are strictly limited. They are divided on a larger scale with beneficial effects for the development of the intellectual capacities, the emotional and willingly moral ones (MEC 2001, MEN, 2013, 2014).

At this level of the school education, the lesson has only 2-3 hours weekly assigned and it is taught by qualified physical education teachers. This has a degree of freedom materialized in specific objectives and the thematic freely approached by the teacher and it is an integrated part of a lesson system created in order to achieve the reference objectives for each learning unit (Șerbănoiu, 2002).

Throughout the primary level, the student assimilates a large amount of information, developing new ways of understanding and other qualities such as attention, imagination or ideas expression through language and thinking, all these directly evolving with age (Condor, 2012; Colvin et al., 2016).

The ability to study becomes and remains the most important activity and obligation of the student at a small age having undoubted influence over his personality. The school's primary level is characterized by a very important period in which the social abilities, the cognitive and non-cognitive capacities begin the installation process. The school success or failure is important not only from a social point of view but also, at this age is the one that shapes the future personality (Sion, 2007).

Being a transition period, the spine is exposed to deformation by incorrectly sitting at the desk or by carrying the schoolbag. The dysfunctions, the growing and development spine crisis can be controlled during the physical education hours, through the diversity of movement games that trains the whole bone, muscular and articular system.

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During this age period, the children's interest for movement is very increased. Their desire for movement and physical effort is caused physiologically and that is why, any diminish or limitation of their motor activities has important repercussions on the vital functions of the human body. Any child stimulation to take part to physical education and sport activities creates an ideal environment for personal and social development and it is not only a training for the body (Raudsepp & Päll, 2006; Rengasamy, 2012).

Among the theoretical notions, the game remains a very important factor in influencing the personality development for the child that goes to school. The game, as a mean of satisfying the rest and recreation necessity, facilitates the physical, functional or social benefits occurrence, creates positive feelings, satisfaction and gives the players the freedom to act.

Referring to movement games, several authors consider that these are activities with particular implication on the players' personality development from several points of view, including the contribution for the social integration (Cârstea, 2000; Netz et al., 2005; Lyakh et al., 2011). Also, these activities are presented as complete activities that are attractive, spontaneous, natural and disinterested, having recreational and compensatory benefits (Epuran, 1990; Dragnea et al., 2006).

Movement games used during the physical education lessons contribute to the development of the analytic character of perception to willingly lead the attention and observation, to the development of our motor memory, to the youth of the imagination, to thinking, to the capacity to notice and anticipate the evolution of certain situations, to initiative and independence, to the correct and harmonious physical development (Badiu et al., 1995).

Applied to children between 7-11 years, these activities develop the factionary coordination, the lateral ability, the balance, the time-space orientation and motility, and also the interpersonal relations, the focus, the creativity, the self-esteem, the cooperation and a behaviour based on healthy lifestyle principles (Nadeau, 2012).

The coordination abilities are defined as "a complex of qualities predominantly psycho-motor which involve the competence of fast learning new moves, the fast and efficient adaptation to different situations, specific to different types of activities, to restructuring the existent motor base" (Dragnea et al., 1999).

The coordination capacity is defined by the specialists in the domain as being a complex psycho-motor quality, at the base, having the correlation between the central nervous system and the skeletal muscles during the movement (Bota, 2000).

The diversification of the learning means and methods agrees with the modern views at the European level regarding the content of the Physical education and sport subject at the school level (European Commission, 2013). From this perspective, the specialists in our domain support the recommendation of activities that increase the amenity of the lessons (Glassman, 2011; Burns et al., 2015; Zurita-Ortega et al., 2018; Wyndham et al., 2018).

Taken into consideration the previously presented aspects, we wanted to conduct a research where we would use movement games for the students at the primary level in order to develop their motor qualities specific for their age. The motor skill is one of the factors which leads to progress and school success for the Physical Education subject.

The research conducted presumed applying these games for all the motor skills. The present paper wants to register only the results regarding the improvement of the motor skill handiness. I have chosen handiness as a favourable aspect for the students' activities, taken into consideration the fact that it is included in the vast issue of psychomotility which can be predominantly developed at this age. The present paper presents the equal contribution of the authors.

Methods

Subjects: the experiment took place throughout the 2017-2018 school year with students learning in a rural environment. 94 students from the primary level, from the third and fourth grade, from The Secondary School "Lascăr Catargiu", village Schela, county Galati participated. 48 students were girls (51,06%) and 46 students were boys (48,94%).

Procedure: the experiment consisted of applying ten movement games that were selected as being appropriate for developing the motor **skill**, the handiness. The activity took into consideration the kipping up with the documents of planning approved at the school level for the Physical Education subject. The number of hours used according to the annual planning for improving the manifestation index of the motor skill- handiness was ten lessons per semester. For each lesson were used two games in order to develop the mentioned skill. The movement games were used in the first lesson of the week and reused in the second lesson of the same week. These were repeated two or four times during the teaching lessons when they were replayed. For the lessons on the second semester the number of repetitions was 3-4, these being considered already assimilated in the first semester. The allocated time for each learning unit was 12-14 minutes. For assessing coordination capacity level 4 tests were applied. The process of these tests was the following:

T1: throwing to a vertical target: standing in one place, throwing with one hand from above the shoulder with a tennis ball at a vertical target having a square shape with a 0,5 m side, situated at a 6m distance and having a 2m height. A success was recorded after 5 throws.

T2: keeping the ball on two sticks while moving on a gymnastics bench: moving on a gymnastics bench (L=3,40 m), longitudinal seated, with keeping the balance of a volley ball on two gymnastics sticks horizontally oriented before the level of the centre. If the ball is dropped, the player stops, the ball is placed again and he/ she continues until descending of the bench when the chronometer stops.

T3: dribbling while moving on the gymnastics bench: the movement takes place from the start of a gymnastics bench (L= 3,40 m), placed longitudinally, simultaneously with the dribbling next to the bench. The time is kept for the track on the bench.

T4: passing to the wall in a numerical order: throwing a handball ball with an arm above the shoulder at a wall from a 2m distance. The target is represented by 9 squares with a side of 33,33m which form a bigger square at a 1m height. The ball will be thrown in each square in a numerical order and in case you miss the throw will be replayed until the target will be touched. The time will be kept between the first throw and the moment when it will be caught as a repercussion from the last square. The bounced ball can touch the ground.

In the following pages, we will present the games nominated for improving the motor skill-handiness, applied during our experiment as a part of our work procedure. These were coded and were used as appendices for the teacher's planning documents for the lessons of this learning unit.

(Î1) The builders: the students are divided in 2-3 teams dispersed on the whole field. At the command "let's quickly build a square", they have to gather themselves in 8-10 seconds and form a square with straight lines. At a given signal they will go back to the initial position before starting the game. Other indications will follow (tram line- two rows gathering, tractor wheel, plane, etc.) The students that organize themselves in the allocated time are declared the winners.

(Î2) The train on the bridge: The students are divided into 2-3 teams in front of the gymnastics benches. At the given signal, one after another, they will go along the bench with the arms stretched sideways and they will go back to their team. The game will be continued with a notebook or a book on the head and on the narrow side of the bench.

(Î3) The contest in pairs: the students displayed on two rows, before the start line, each pair having a ball. At the teacher's signal, they will throw the ball from one to the other while walking at a 20 m distance. After covering the distance the players will go back at the edge of the field, at the row where they belong to. After 2 -3 repetitions, the exercise will be performed with a double step (2-3R) and with running (2-3R). At the replay, the same action will be performed using a slight running. At each repetition, the ball will be changed.

(Î4) The travelling ball: the students are divided into 2-3 teams, in a single column at one arm distance between them and a 3-4 steps interval between teams. In front of each team are placed in a circle an even number of different balls, equal with the team's members and at the end of the column an empty circle. At the teacher's loud signal, the first member of the team will pass the ball backwards until the ball will reach to the last member who will place it in the empty circle and will go forward and sit in front of the column. If the ball will be dropped, the game will be replayed from that point forward. The winning team will be the one which will carry all the balls. Ways of carrying the ball can be performed with the arms stretched, twisting sideways, above the head or between the legs.

(Î5) The tunnel: the students are divided in teams of 6 or 8. Half of the team is situated at 5m in front of the others and keep a circle close to the ground, forming a tunnel at 1 m distance between them. At a given signal, the students from each team move through the tunnel, trying to reach as fast as they can the starting point. During their exercise they need to keep an arm-length distance. The game is repeated as many times as the players' total number and after each repetition the players who support the circles are changed.

(Î6) The ball in the circle: the students form a circle (one or more) at a two arms-length distance. A student will receive the ball and will start the game by throwing it to the colleague from the right. If the ball is not dropped, the circle will be enlarged with another arm-length distance and the ball will be changed. Throwing and catching is performed with both hands. If there are more circles, a contest can be organized.

(Î7) The ball between stakes: the students are divided into 2-3 equal teams. From each team, a leader is designated to sit 20m far from the rest of the team and throw the ball to the rest of the team. At a given signal, the first player from each team will cover the distance till the leader by multiple dribbling among five stakes zigzagly arranged at a 3m distance. After circling the last stake, the ball can be thrown to the leader who will throw it to the next player and the game is replayed. The winner team is the one who gets first behind the leader.

(Î8) Two balls: the students are divided in 3-4 teams, arranged in a single column. The first player from each team has two balls (basket balls and handball) and at the teacher's loud signal he must lead the balls using his legs to the

circle created at a 15 m distance . The puts the balls in the circle and comes back to his team coming across a gymnastics bench(3m), keeping his balance . When he reaches his team the next player goes following the same route in a reverse order.

(I9) The moving target: The students are divided in 2 teams arranged in line behind a line drawn on the ground at a 10m distance one from the other, both teams having several tennis balls. At his signal, the teacher launches between the two teams a gymnastics ball and the members of the teams smack it with their balls in order to make it pass the of the opposing team.

(I10) The balls' transportation: the collectivity is divided into two equal teams having an even number. The team's players will by grouped in pairs and at the teacher's signal, the first ones will have to carry three balls (basket,tennis, handball) using two sticks , maintained using the arms as they choose. The followed track will consist of circling a stake found at a 5m distance and coming back, giving the sticks maintaining the balance and replaying the game. The winning team is the one that finishes the track first. If they drop the balls, these will go to the next players. The game can start with a ball and their number can increase gradually.

Results and discussion

The results registered at the initial and final tests applied during the experiment were gathered and analyzed from a statistically point of view. The statistical assay was made using the SPSS 23.0. program. This analysis was conducted in order to observe if the progress registered by the involved groups was or not a significant one. The statistical analysis conducted both in the interior of the groups but also among them. The results' presentation is made separately for the girls' groups and for the boys' groups. The boys' and girls' groups results are briefly presented in Table 1. The interpretation and the discussion of the results was made in a descriptive manner.

Table 1. The statistical analysis within the girls' group

Trials	Groups		Girls					
			Control group (n=24)			Experimental group (n=24)		
			T.I. x±S	T.F. x±S	t	p	T.I. x±S	T.F. x±S
Throwing to a vertical target(no. of scores)	1.75±0.84	3.50±0.72	-19.38	.000	1.87±0.61	3.75±0.84	-15.00	.000
Keeping the ball on two sticks while moving on a gymnastics bench (sec.)	14.24±2.45	12.99±2.57	6.74	.000	10.54±1.46	9.64±1.35	14.24	.000
Dribbling while moving on the gymnastics bench (sec.)	13.16±1.09	12.47±1.20	7.52	.000	12.14±1.14	11.14±1.33	13.54	.000
Passing to the wall in a numerical order (sec.)	24.82±0.97	22.85±1.03	10.13	.000	22.46±1.09	20.72±1.08	7.38	.000

As we can see in Table 1. the girls' witness and experimental groups had close values during the initial testing for two from the applied trials (throwing to a vertical target and dribbling while moving on the gymnastics bench). In the case of the other two trials performed for the evaluation of the motor skill: handiness, (keeping the ball on two sticks while moving on a gymnastics bench and passing to the wall in a numerical order) the registered differences at the initial tests were bigger.

At the final tests I could observe that the girls from the witness and experimental groups obtained favorable results, superior from the initial ones. These favorable results were registered for all the tested trials. Through the analysis conducted within the girls' group it can be observed that the achieved progress is a significant one because the statistical indicator is $p < 0.001$, fact that underlines a strong progress. These results have shown that the methods used during the teaching-learning process were efficient. Both the movement games and the traditional methods used during the Physical education lessons had benefic influences on the improvement of the manifestation index of the motor skill-handiness.

The statistic analysis of the results was also conducted between the two girls' groups in order to observe if the means represented by the movement games used in the experiment group case were efficient during the training process. The results were briefly presented in Table 2. From the gathered data from Table 2, it can be observed that in the four trials case, the results registered for the girls' experiment group were superior to those obtained by the witness group.

Table 2. The statistical analysis between the girls' groups

Trials	Groups	Girls			
		Control group (n=24)		Experimental group (n=24)	
		T.F. x±S	T.F. x±S	t	p
Throwing to a vertical target (no. of scores)		3.50±0.72	3.75±0.84	-1.10	.227
Keeping the ball on two sticks while moving on a gymnastics bench (sec.)		12.99±2.57	9.64±1.35	5.65	.000
Dribbling while moving on the gymnastics bench (sec.)		12.47±1.20	11.14±1.33	3.61	.001
Passing to the wall in a numerical order (sec.)		22.85±1.03	20.72±1.08	6.94	.000

Nevertheless, the progress registered by the experimental girls' group was significant only in the case of three tested trials ($p < 0.001$). For the trial "throwing to a vertical target", although the average for the obtained results was superior in the experimental group case, the registered progress was insignificant ($p > 0,05$). This showed that for this type of trial, the traditional methods have similar effects with the movement game use. The same manner of analyzing the results from the initial and final tests was also used for the boys' groups involved in the research. The results are briefly presented in Table 3.

Table 3. The statistical analysis within the boys' group

Trials	Groups	Boys							
		Control group (n=22)				Experimental group (n=24)			
		T.I. x±S	T.F. x±S	t	p	T.I. x±S	T.F. x±S	t	p
Throwing to a vertical target (no. of scores)		2.25±0.98	3.87±0.79	-11.19	.000	2.31±0.83	4.31±0.71	-21.49	.000
Keeping the ball on two sticks while moving on a gymnastics bench (sec.)		10.16±2.61	9.03±2.35	6.58	.000	8.09±2.94	7.07±2.55	7.49	.000
Dribbling while moving on the gymnastics bench (sec.)		10.0±1.12	9.02±0.99	4.98	.000	9.48±0.61	8.11±0.73	17.34	.000
Passing to the wall in a numerical order (sec.)		20.11±1.08	18.39±0.93	28.07	.000	18.99±0.78	17.86±0.88	12.70	.000

The results' analysis showed the fact that within the groups the average of the final performance was superior to the initial one both for the witness and the experimental group. The registered progress for both groups was significant, aspect confirmed by the value of the indicator $p < 0.001$. This progress factor registered significant values for all four trials that were applied during the experiment. The results of the statistical analysis prove the idea that methods used during the experiment with the experimental group were efficient and pushed this group towards a significant progress.

Table 4. The statistical analysis between the boys' groups

Trials	Groups	Boys			
		Control group (n=24)		Experimental group (n=22)	
		T.F. x±S	T.F. x±S	t	p
Throwing to a vertical target(nr. of scores)		3.87±0.79	4.31±0.71	-1.97	.054
Keeping the ball on two sticks while moving on a gymnastics bench(sec.)		9.03±2.35	7.07±2.55	2.70	.010
Dribbling while moving on the gymnastics bench(sec.)		9.02±0.99	8.11±0.73	3.49	.001
Passing to the wall in a numerical order(sec.)		18.39±0.93	17.86±0.88	1.94	.059

Comparing the average of the results obtained by the witness group, shows that, from a statistical point of view, the experimental group registered a significant progress only in the “dribbling while moving on the gymnastics bench” trial case, its value being $p < 0,001$. A considerable progress can be seen also for the “keeping the ball on two sticks while moving on a gymnastics bench” trial, having a value of $< 0,01$. The results for the other trials, although were superior from the registered average values angle by the experimental group, they cannot be considered significant because the limit is $p > 0,05$.

This aspect shows us that by performing movement games, there were variables that should be improved or whose performance did not raised to the expectations. The selected games were not appropriate for the established purpose or were not appropriate for the students' age. Other aspects can be represented by the usage of different materials that were not efficient, allowing a time too short for practice, inefficient time assigning during training or dispersing the group in an inefficient performing formation.

Conclusion

After conducting this experiment, it can be showed that the manifesting index of the motor skill-handiness was improved through movement games practice. In the girls' experimental group case, these results were superior to those registered for the boys' experimental group. This obtained a high significance limit ($p < 0,001$) for three of four tested trials within the experiment.

The boys' group registered a high significance limit only for 2 of the tested trials ($p < 0,001$), whereas for the other two trials were insignificant ($p > 0,05$) comparing with those of the witness boys' group. At the end of this analysis regarding the improvement of the index of the motor skill-handiness, some evaluation can be made by integrating the learning unity assigned for the motor skills in the learning process.

Practicing handball in a preponderantly way by the girls within the learning unities assigned for the game assured a favorable transfer towards the manifestation of the quality named handiness. Practicing football in a preponderantly way by the boys within the learning unities assigned for the game does not show the same degree of transfer towards this motor skill.

The numbers of allocated lessons for this motor skill (handiness) was probably insufficient. Also, the division by links during the lesson makes the allocated time to be less, therefore insufficient for practicing an appropriate number of repetitions that could generate some nervous activities benefic for this skill. The movement games proved to be efficient as method of training for the students from the primary level and also as a method of repetition during the practice lessons. The attractiveness and the variety of these games is benefic for educational purposes and its limits are due to the structure of the traditional lesson.

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Achilles Tendinitis by Mechanical Overload – Diagnosis, Attitudes, Therapeutic Options

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Abstract

The present paper aims both to identify the causes of onset of the Achilles tendinitis in the target population (athletes) and their correct and early diagnosis, as well as to validate the therapeutic options. This prevents complications, reduces cure and recovery time. The recognition must be appropriated by both the specialized personnel, physicians, physiotherapists, the physical education teacher, as well as the athletes. Once the issue, condition is identified, it is imperative to follow the therapeutic steps: firstly, the rest of over-physical activity, the appropriate therapeutical attitude led by a doctor, a motor-rehabilitation program, and very important a relapse prevention, program led by a physical therapist in collaboration with the teacher of physical education and sport.

Material and method: The study includes 22 patients aged 17-38 years practicing sport at least three times a week, 90 minutes each time. The selected subjects come from the Specialized ambulatory of the Medgidia Municipal Hospital - Orthopedics-Traumatology. The study was conducted at the „Smile and Color Center” (NGO Medgidia), the kinetotherapy and motor recovery laboratory.

Results and discussions: The identification of the etiological causes involved ensures the therapeutic success and leads to the successful prevention of relapses. The most common cause is the excessive tension of the tendon due to intense physical effort, but also activities that involve repeated and constant movements over a long period of time (bicycle pedaling, stepper in sport rooms, climbing - "too much and too fast"). Foot deformities predisposing to chronic tendon inflammation should not be neglected.

It is contraindicated self-diagnosis and empirical treatment even in mild forms. Of the 22 patients, 15 had indications for treatment with PRP (platelet-rich plasma), but only 10 received this therapy.

Conclusions: Therapeutic options are based on the degree or stage of the tendon inflammation, the time elapsed from onset, the patient's compliance, and the age of the patient.

Keywords: achilles tendinitis treatment; platelet-rich plasma; tendon inflammation.

Introduction

The hereby paper work aims to identify the onset causes of the Achilles tendinitis in the target population (athletes) and their correct and early diagnosis, as well as to validate the therapeutic options. This prevents complications, reduces cure and recovery time. The recognition must be appropriated by both the specialized personnel, physicians, physiotherapists, the physical education teacher, as well as the athletes. Once the issue, condition is identified, it is imperative to follow the therapeutic steps: firstly, the rest of over-physical activity, the appropriate therapeutical attitude led by a doctor, a motor-rehabilitation program, and very important a relapse prevention, program led by a physical therapist in collaboration with the teacher of physical education and sport.

Material and method

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The identified causes

The identified causes both within the research lot and the general population that could determine the inflammation of the Achilles tendon (tendinitis) are multiple:

- The repetitive tension on the tendon and the surplus tension of area during specific movements (while practicing different sports as tennis, football, basketball, which suppose repetitive jumps, sudden stops, intense physical effort);
- The damages, frequently, occur after an inactive period, when the tendon is rigid and inflexible. Long distance running or very long distance walking;
- The uneven ground, the superficial warming and training and the incorrect training can determine the occurrence of this trend (Iaroslav Kiss. 2018);
- The inappropriate shoes that do not offer adequate support of the plantar arch or those with rigid heel part;
- The high risk of Achilles tendinitis is not only for athletes. Suddenly wearing the low heel shoes, after a long period of wearing high heel shoes (fact that determined the shortening of the Achilles tendon), the tendon is forced to extend more than its normal limit; Thus, women that, frequently, wear high heel shoes are susceptible to suffer of tendinitis, because the high heel has shortening effect of the Achilles tendon. This means that, when wearing low heel shoes, the tendon is extended and under tension, thus, its inflammation occurs. The sedentary persons that start practicing a high risk sport, or suddenly begin an intense physical activity, are, also, susceptible to develop an Achilles tendinitis (France, C. Robert, 2011);
- The local corticosteroids injections may lead to the weakness of the tendon or even its rupture;
- The antibiotics treatment from the quinolones class could represent a cause of tendinitis or tendon rupture;
- If the case may be, when, congenitally, the tendon is shorter and rigid, this makes it more vulnerable to develop a tendinitis compared with the general population.
- Another important cause of the tendinitis is represented by the enthesitis from the chronical inflammatory diseases. Contrary to the other cases that could cause tendinitis and have been above-mentioned, (where the mechanic factor or some medicine were the determinant factors), in case of some inflammatory diseases (as poker back, reactive arthritis, psoriatic arthritis, indeterminate spondyloarthropathy), the tendinitis is caused by the chronical inflammatory process which is located at the level of insertion areas of the ligamenta, tendons and articular capsule (enthesitis-enthesitis) to the bone. The enthesis represents an area subject to a high mechanical tension, it is high vascularized and susceptible to antigen deposits. The inflammation of the enthesis is called enthesitis. The result of the inflammatory process is the Achilles tendinitis. The long term evolution of the local inflammatory process is followed by ossification and the emergence of the spiculae visible at the level of the calcaneus on the X-ray study (Gornea F. 2010).

Evolution and complications.

The tendinitis is the acute inflammatory illness, in evolution with protract potential, characterized by different pains that are felt during an effort or even after quitting it (15 patients came back at the special medical office after a symptomatology with progressive evolution of at least 3 months).

The untreated, ignored illness becomes chronical, fact that causes fibrilar degenerative traumas in the tendon's volume/the tendinosis – the degenerative type illness from which some microcracks could occur at the level of the tendon, but also knobs located on the back of the ankle, along the tendon (9 patients have been diagnosed with tendinosis in the illness's evolution).

The evolution of the fibrilar degenerative process could cause the partial or even total rupture of the tendon – accompanied by intense pain and the distinct and severe deficit of walking (Binder A. & all, 1985).

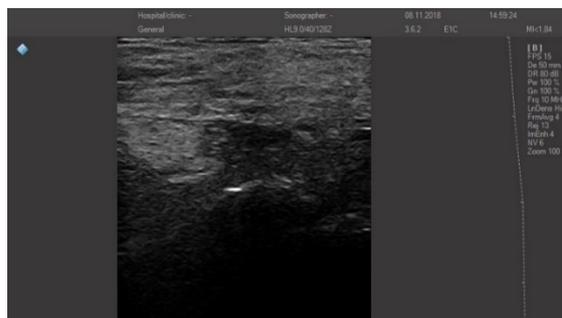


Fig. 1. Echography aspect of the Achilles tendon rupture.

3. Diagnosis.

The first stage of the diagnosis can be established based on the clinical examination and of the anamnesis. One incident only can cause a local inflammation or, more often, the tense movements of a higher amplitude than the physiological one can cause tendinitis (Weinstein S & Buckwalter J, 1994). The symptoms of the Achilles tendinitis gradually occur, starting with a slight or moderate pain at the posterior level of the ankle or cnemis, often at 2-3 cm from the level of the distal insertion on the calcaneus tuberosity. If unhealed and the activity that caused the pain continues, the symptoms become more intense. The pain, dominant symptom, prevails the clinical picture, occurs during or after the physical activity, subsequently occurring while resting, it is continuous and very intense. It associates intumescence located around the tendon, often with nodal aspect (Roos EM & all, 2004).

As diagnosis image means I have used:

- The ecography can easily assess the functional status of the tendon, but also the degree of the trauma. The advantage is represented by the fact that it is a cheap observation, quickly performed, which allows the different diagnosis with other illnesses (Ohberg L, Alfredson H. 2002).



Fig. 2. Ecography with linear guide.

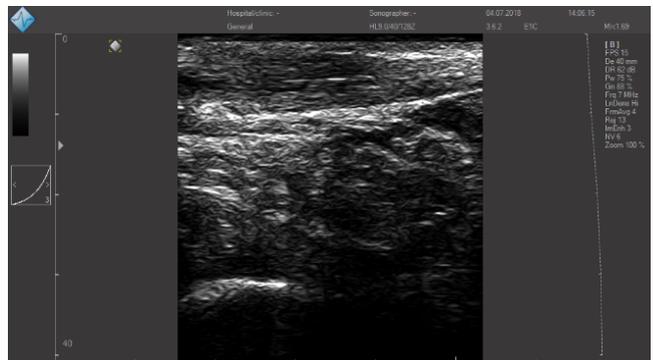


Fig. 3. The fibromatous knob within the tendone.

- The NMR examination can either reveal the simple inflammation of the tendon (the intra-oedem and peritendon), the presence of the fibrosis (in chonical cases) or the degenerative traumas from the tendinosis, or it can describe the presence of partial or total rupture of the tendon.



Fig. 4. NMR image of the same Achilles knob.

- The X-ray study of the area can either have normal aspect, or it can reveal the presence of the intratendinous calcification, or at the level of tendon's insertion on the dorsal tuberosity of the calcaneus or on the plantar fascia.

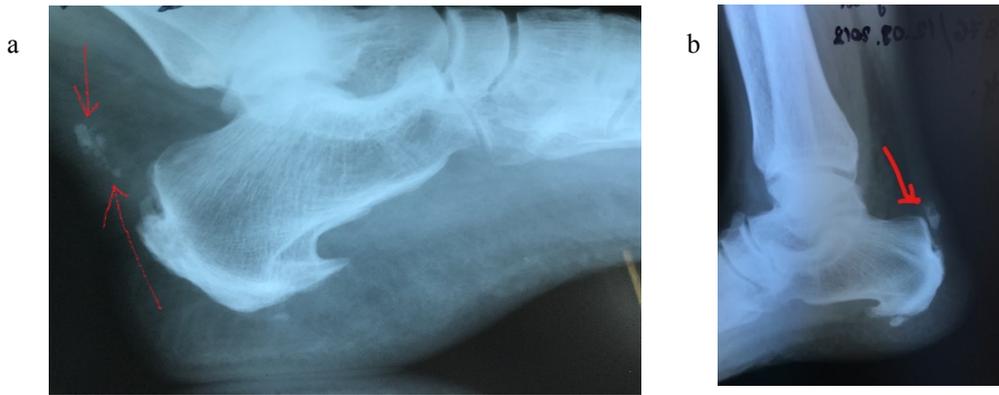


Fig. 5. (a) X-ray image; (b) Calcification of the Achilles tendon.

4. The treatment of the Achilles tendinitis.

The best treatment options are determined by the degree of acuteness of the tendinitis. The treatment consists of rest and quitting the causing factors, medicine that alleviates the pain and inflammation, physical therapy. Thus, in multiple cases, a simple treatment, according to the coach's or the physical education teacher's advice, performed at home, can clear the issue, while in the more acute or long lasting cases, special treatment is needed. If the pain lasts, after a few days of nonoperative treatment, the doctor's advice must be requested in order to avoid a higher harm.

At the simple stages, the R.I.C.E. treatment is applied (rest, immobilisation, compression, foot elevation). Resting is the most important treatment measure for the tendinitis. Continuing the sport activity which implies the tension of the inflamed tendon can cause the aggravation of the issue. The activities that imply the plantar bending of the ankle are to be avoided. A low compressive elastic band is applied on the ankle, and over it one can put a bag of ice which has anti-inflammatory and anti-algesic effect, the damaged foot being kept at rest and elevated. In severe or recurrent cases the ankle's immobilisation, in gypsum device, can be indicated.

on-steroid anti-inflammatory medicines that clear the pain, inflammation and local oedema are recommended. After 2-3 rest days the kinetotherapy with flexion-extension movements of the ankle should begin. In the recovery stage, the physical therapy's aim is to adjust the force and flexibility deficiency.

The local infiltrations with corticoids (triamcinolon-acetonid, betamethasone, methylprednisolone acetate): have fast effect, shortening very much the recovery period. The infiltrations are performed together with a local anesthetic of 1% xilina type, both with local effect and, especially, because of the fact that it inhibits the vasomotorial reflex at cortical level.

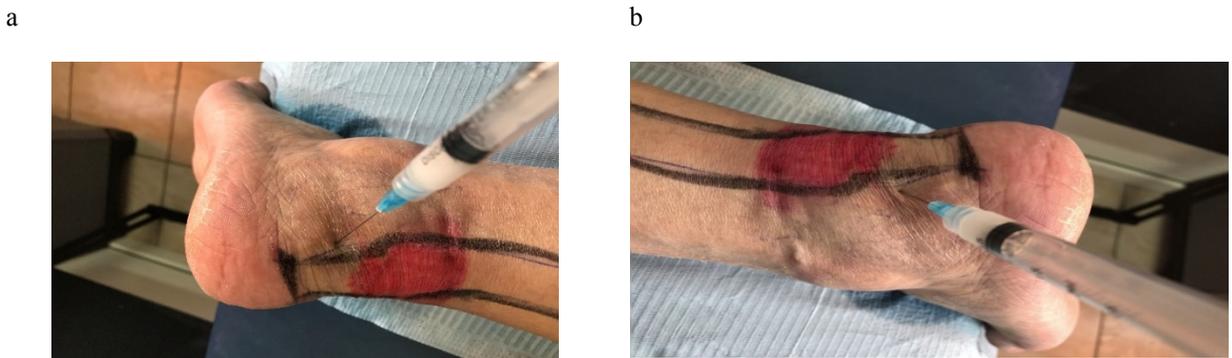


Fig. 6. (a) Infiltrations with kenacort; (b) Infiltrations with paratendon xilina.

In the compliant types of treatment, after 24-48 rest hours, the kinetotherapy with flexion and extension passive movements at the level of the ankle is performed, in order to slender and regain the elasticity and the length of the

Achilles tendon. A rest higher than 48 hours is not recommended, in order to avoid the muscle anastalses and atrophies, articular tenseness.

In the chronicized types, obstinate to non-operative orthopedic treatment, the surgical treatment can be recommended, or when the symptoms are still present after 6-12 months, or in case the first medical examination at the specialist is performed after this period of time. The filamentous adhesions are removed, the knobs are excised, the tendon is decompressed, the degenerated parts of the tendon are removed, the osteophytes are excised or the ruptured tendon reconstruction is performed.

Discussions. In order to benefit from or to initiate a type of treatment, the patient needs a NMR examination or an echography, in order to see the tendon's damage degree. Also, a close anamnesis is needed in order to exactly discover the moment when the inflammation occurred, its evolution and the prescribed treatments. In the first 3 months since the inflammation occurred, the tendinitis is considered as being acute, fact which means that the structure of the tendon is kept, and the treatments with anti-inflammatory (tablets, ointments, physiotherapy, infiltrations) have healing effects, with restitutio ad integrum, the complete healing of the tendon. In these cases there is only one variable: what caused the inflammation? If the patient performs an activity that causes this inflammation, and he can not interrupt or change it, in this case the inflammation could occur again. When the inflammation occurred again for more than 3 months, it becomes chronic, which means that the structure of the tendon has changed by fibril degeneration and the emergence of some new anarchically disposed collagen fibers, and the anti-inflammatories can not have anymore a healing effect, because the structure of the tendon remains changed and the pain lasts. In all these cases, the only treatment is the regenerative with blood platelets or STEM cells – PRP injections.

The most important treatment for the chronic tendinitis, is the STEM cells therapy. Out of the 5 patients included in the research, 15 of them had an obstinate symptomatology to the treatment and 2-3 months protraction. Out of them, 10 athletes have benefitted from the regenerative treatment with platelet-rich plasma injections. There have been performed 3 injections every 14 days. The recovery treatment has been initiated 7 days after the first injection. The reintegration in the sport activity has been usually performed 45 days after the administration of the PRP therapy. The patients have been under observation 9 months after the therapy. Thus, only 2 out of the 10 have still had a painful sensitivity when performing sustained physical effort.



Fig 7. PRP treatment in degenerative type Achilles tendinitis.

Conclusions.

The diagnosis of Achilles tendinitis is established based on the anamnesis (the discussion with the patient), of the clinical examination and paraclinical investigations. The patient feels pain in the heel and along the tendon during the physical activities or after ending the physical activity. The pain becomes more acute when the patient stands on his toes, when walking or running. After an evolution period, the pain could also occur while resting. The pain is accompanied by tendon tumefaction, at 2-3 cm from the insertion on the calcaneus. When extending the tendon, the dorsal flexion of the foot, the pain becomes more acute and the local stiffness occurs, sometimes the emergence of an intratendinous palpable knob could occur.

The most frequent cause is represented by the repetitive tension on the tendon and the overload of the area during some specific movements, corroborated with the inadequate warming or the incorrect training.

Regarding the treatment, the options will be determined by the severity degree of the tendinitis.

Thus, the treatment could be established, as follows:

- For the soft types, R.I.C.E. and kinetotherapy treatment is applied;
- For the moderate types, the medicine therapy with non-steroid anti-inflammatory is normally administered and also with steroid anti-inflammatory locally administered, paratendon;

- For the degenerative chronic types, the therapy with plasma injection, PRP is recommended;
- For the tendon rupture complicated types, the surgery is necessary in order to rebuild it.

All the four therapeutic types associate the medical recovery with kinetotherapeutic exercises, that have to be correctly performed, under the observation of a specialist. During the kinetotherapy sessions the aim is to strengthen the dorsal muscle of the cnemis, in order to prevent the possible damage recurrence by overtensioning the tendon. Also, the kinetotherapy has as aim the correction of different force or flexibility deficiencies through the isometric and isotonic exercises.

In order to prevent the inconvenience caused by the Achilles tendinitis one recommends for the athletes: to adequately warm the tendon and the cnemis muscles before performing different tough physical activities; to wear adequate shoes, avoiding the rigid shoes that can tension the Achilles tendon or can inflame it; to have recovery breaks, during some overtensioning activities; to gradually increase the effort level; to do stretching for the cnemis muscle and exercises in order to strengthen it.

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The Osteochondritis in Young Athletes Aged Between 8 and 15 Years Old

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Abstract

This paper aims to identify the most frequent localizations of osteochondritis and their specific kinetic programs; assessing the incidence of osteochondritis in the target population (athletes); assimilation of the h-H-h therapeutic concept, or post-hospital / post-institutional therapy.

Material and method: The research that was the subject of the present study was performed on an experimental group of 35 sportive subjects (24 boys and 11 girls) of different ages with the diagnosis of juvenilis osteochondritis. Selected subjects come from the Specialized Ambulatory of the Medgidia Municipal Hospital - medical office of orthopedics traumatology.

Results and discussions: Therapeutic outcomes depend on the precocity of diagnosis, addressability to a specialized service, evolutionary stage, patient compliance, osteochondritis type. The evolution of recovery and the time needed for reintegration in sports life depends on the evolutionary stage in which kinetotherapy begins, the localization of osteochondritis, the weight of the child and sex (the evolution is better for girls); the onset age is in proportion of 82% of cases around the age of 8-9 years, the explanation being probably due to the intense metabolic changes occurring at this age, to the more pronounced fragility of the growth cartilage, the overloading of immature bone structures. The most common localizations: anterior tibial apophysis or Osgood-Schlatter disease (17 children), posterior calcaneal apophysis or Sever disease (8 athletes) and vertebral osteochondritis (Scheuermann disease, 3).

Conclusions: The best results are obtained where the kinetic treatment was started as early as possible. Medical treatment with local or general NSAIDs, local injections of corticoids or plasma has only in stage three treatment recommendation. Recovery gains are important during treatment, but are easily lost with cessation, which recommends continuing at home, thus validating the integrative kinetotherapeutically concept: home-Hospital-home. Compliance of the child and his family is defining for the therapeutic outcomes.

Keywords: osteochondritis; Osgood-Schlatter treatment; kinetotherapeutically concept.

Introduction

The hereby paper work focuses on the identification of the most frequent localizations of osteochondritis; the right therapeutical attitude corroborated with their specific kinetic programs; the judgement of the osteochondritis' rate in target population (sportive children); the assimilation of the therapeutic concept h-H-h or of the post hospital/post institutional therapy.

The juvenilis osteochondritis

The juvenilis osteochondritis represents the complex of signs and symptoms caused by the inflammation of the growth cartilage and of the subjacent bone, subcartilaginous. The bone traumas (the fragmentation of the growth bone nucleus, the trauma of the subcartilaginous bone are caused by the failure of the local blood circulation), sometimes having very important consequences on the sport activity, but also on the daily comfort.

The osteochondritis is an ischemic-inflammatory disease which frequently affects the bone-cartilage junction area, at the age between 8 – 16 years old.

The growth cartilage, together with the growth nucleus is responsible for the growth in length and width of the bone.

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At the children and adolescents, in full growth process, the circulation of the subcartilaginous bone is fragile, and the micro-traumas of the active or sport life could involve circulatory disorders in the bone structure. The alleviation under specific limits or the ischesis of the circulatory flow in some parts of forming skeletal system may cause bone necrosis, more or less elongated.

This pathology is explained by the circulatory shortness, (vascularization failure) which affects the bone located under the cartilage during growth. The micro-trauma can represent the predisposing cause, but also, aggravating circumstance of the osteochondritis, mainly, during the demanding sport activities on the defective area.

The cause of the osteochondritis is not yet identified. It could be an association of several factors: a genetic involvement related to environment factors, as the intense sport activity or static failures (spine deformity – kyphoscoliosis, foot deformity – varus equin, platfus, talus valgus); within the collagenosis, inflammatory disease of the bindweb; an insulinic growth factor (IGF1); within coagulopathies, coagulation congenital disease; skin heart disease; active or passive smoking.

Material and method.

The selected subjects come from the Specialized Ambulatory of Medgidia Municipal Hospital - medical office of orthopedics traumatology. The kinetic assessment was performed within the Smile and Colour Centre (Medgidia NGO).

In the first stage of the study the general impact on age categories, anatomical location and gender of the juvenilis osteochondritis was appreciated, in Medgidia municipality, in the past 5 years (2014-2018). In the second stage of the study the evolution of the osteochondritis, within an experimental lot which benefited from adequate kinetic treatment, was followed-up.

Thus, on a general population of 39,800 inhabitants from Medgidia municipality and of 5,800 children with the age between 6 and 18 years old (according to the census from 2011), the impact of the diagnosed cases (newly-diagnosed cases) of osteochondritis in the only Specialized Ambulatory from the town is of 176 cases, i.e. an impact of 3.03% of the target population and it is represented as follows:

- pre tibial apophysis or Osgood – Schlatter disease a number of 62 cases were identified, 40 boys and 22 girls with a start-up age of 80% between 8 and 9 years;
- pre apophysis of the calcaneus or Sever disease of 51 cases, 46 boys and 5 girls. The start-up age of 80% between 8-9 years old, 5 cases at 6 years old, 5 patients at 12 years old;
- vertebral osteochondritis or growth dystrophy also called Scheuermann disease, 28 cases, 26 boys and 2 girls. Start-up age 13-15 years old/ 80%, only 2 cases under 9 years old;
- femoral head osteochondritis or Hass disease, 15 cases, 12 boys and 3 girls. Start-up age 8-9 years old, 80%;
- tarsus scaphoid or Kohler I disease – 5 cases, 4 boys and 1 girl. Also, the start-up age is between 8-9 years old.

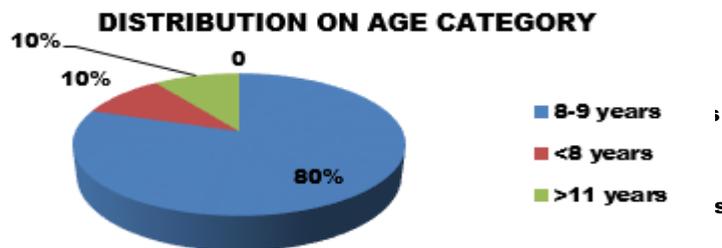


Chart 1. Graphic representation of boys/girls report in osteochondritis with other localisation.

It must be mentioned that, within the target population of 5,800 children between 6 and 18 years old, 3.03% represents the impact, i.e. only the new-diagnosed cases during the study, the prevalence, which takes into account both the old and new-diagnosed cases of the osteochondritis, at the same population being even greater.

Equations and formulae should be typed in Mathtype, and numbered consecutively with Arabic numerals in parentheses on the right hand side of the page (if referred to explicitly in the text). They should also be separated from the surrounding text by one space.

$$I = 3.03\% \quad (1)$$

The statistics of the Orthopedic Medical Office, above-mentioned, registered due to SIUI program provided by the National Health Insurance Office shows a prevalence of osteochondritis of 7.8%, doubling the observation period up to 10 years.

$$P = 7.8\% \quad (2)$$

The subjects of the research. In order to fulfill the objectives from the hereby paper work, an experimental lot of 35 patients was created, composed of children of both sexes, with the age between 6 and 15 years old, all of them being diagnosed with juvenilis osteochondritis.

The main therapeutical principles are individualized based on the localization of the osteochondritis and exposes their regional characteristics. Osgood-Schlatter disease (also, known as the tibial tubercle apophysis or OSD) is an inflammation of the pre tibial tuberosity and of the patellar subjacent tendon (Botez Paul, 2001).

The risk factors include (especially in sport) the excess of jumps and quick direction changes, and they occur during the growth period, at teenagers (France, C. Robert, 2011). The disease is classified according to the symptoms on three gravity stages:

- stage 1 - the pain occurs after the physical activity and disappears in one day maximum;
- stage 2 - the pain occurs during the physical activity, persists after it and disappears in one day maximum;
- stage 3 – the pain is continuous and limits the physical activity of the child (Gotia, D.G. 2001).

The intense knee pain is, usually, the symptome with which the patients come and that occur during the activities as running, jumping, grooming and stair running.

Unhealed at the right time, the tuberosity can fragment (because of the repeated breaking, fragmentation during the shocks), fragment which detaches and ossifies. Usually, the function of the knee is not affected, but intermittent pain may occur (Varna, Al. 1984). After the calcification, the patients must introduce in their daily habits, some mobility exercises for the knee, walking on uneven ground, beach running etc., in order to improve the force of the quadriceps, gastrocnemieni, adductors and abductor muscles of the hip.

The treatment begins with the simple rest or the limitation of the physical effort, continuing with the orthopedic treatment with immobilisation in gypsum device, between 2 and 6 weeks. During the period of gypsum device the kinetotherapy with isometric contractions is associated, and after the elimination of the gypsum, the mobilisation of the knee's joint. In stage 3, local infiltrations with corticoid or plasma treatment, PRP could be indicated. The plasma treatment has the advantage of cell contribution with renewable effect both on the tendon and, especially, on the suffering cartilage.



Fig. 1. PRP treatment in apophysis stage 3.



Fig. 2. 14 years old patient with pre apophysis (patients included in the research).

The pre apophysis of the calcaneus or Sever disease. It is an osteochondritis of the foot, more specific, of the dorsal area of the calcaneus, one of the seven tarsian bones. It occurs because of the acute or chronic over stressing of the Achilles tendon on the posterior apophysis of the calcaneus which is not fully ossified (Iaroslav Kiss, 2018). It often occurs at boys because of the vascular factor, it is painful when sitting on your toes, expanding the Achilles tendon (Barnett, H. 1972).

Symptomatology: pain of the calcaneus, accentuated when resting (especially at night) and by the pressure put on the calcaneus. Sometimes the interest can be bilateral. Walking can be painless and the only objective sign is represented by the high local sensitivity at palpation and pressure. The pain increases in intensity when standing on toes or when running (Vasile Marcu & Dan Mirela, 2006).

This disease being auto limitative, the treatment will be symptomatic only and consists in the correction of the foot's static by elevating the heel with 6 mm (the high tension from the Achilles tendon is eliminated), the limitation of the physical effort (ankle and foot mobility) then a program of physio-kinetotherapy is established, which is focused on the progressive recovery of the normal function of the foot in conditions of growing intensity physical effort (Mureşan Doina, 2009).

The evolution is often favorable, but if the pain persists for a long period, one must take into account the possibility of installation of some residual sequelae that would limit the normal function of the foot.



Fig. 3. Radiological aspect of the calcaneus osteochondritis. Children that are part of the research lot. The fragmentation of the bone nucleus of the calcaneus can be observed and the fringed aspect of its pre tuberosity.

Scheuermann disease is a frequent growth osteochondritis, characterised by the damage of the vertebral bodies' cartilage because of an insufficient blood flow, the occurrence cause remaining unknown. Symptoms and signs:

- when the disease damages the dorsal rakis, it causes kyphosis (round back) which, unhealed, becomes irreducible once the growth ends;

- when it damages the lumbar axis, it does not, generally, translate by lack of symptoms during the adolescence, but it causes a damage of the vertebral plate, responsible of lumbar pain and early arthritis at the young adults.

Evolution and treatment:

- if the kyphosis is little emphasized, the active kinesitherapy is recommended; also, one must quit sport and stressing the spine by carrying heavy loads. If the kyphosis is emphasized and the growth has not finished, the corset aid reduction is necessary.

The disease caused by the microtraumas, Scheuermann vertebral epiphysis or the vertebral osteochondritis is, frequently, met at the people practicing gymnastics, athleticism or sport games. It occurs at children, during the growth period, often, between 12-15 years old. It damages, especially, the thorax spine – the classical form of Scheuermann disease, frequently located between T7 – T10 vertebrae. There is also the dorsal-lumbar form of the disease, more often, associated with traumas and back pain. It occurs at people practicing gymnastics, football and tennis.

During the growth process, the vulnerability at microtraumas of the body is bigger, fact that causes this disease.

The symptoms consist in pain around the spine, emphasized by the effort, state underlined by fatigue and the occurrence of kyphosis. Specific modifications are radiologically emphasized: Schmorl knobs, conformation anomalies of the vertebral bodies, modifications of the pre acentric listel, round kyphosis. The Schmorl knobs - intraspongious hernia - occur by prolatabation of discal tissue favored by solutions of discontinuity of the cartilage plaque that covers the vertebral body.

The discovery of the disease at an adolescent sportsman involves quitting the sport activity and immediate spine stabilization treatment.

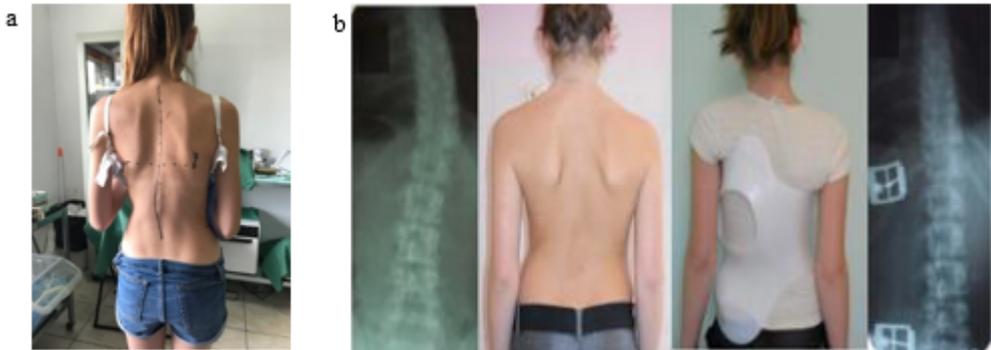


Fig. 4. (a) X Scheuermann disease, 14 years old patient included in the research; (b) scoliosis correction with Boston corset.

The treatment associates medication, akinesis via correct posture and corset use, kinetotherapy associated with hydro-kinetotherapy.

Kinetotherapy – programs with exercises according to Klapp, Cotrel, Niederhoeffler- Egidi, Vojta method, back and bras swimming, usage of orthopedic mattress with small pillow, ergonomic chair are recommended during the day.

The kinetotherapy focuses on kiphosis reduction with stretching and muscle toners exercises for the paravertebral muscles, active exercises with training equipment, espalier structure, different objects, Meziers method.

The kinetic program comprises corrective and ultra corrective postures of the spine; respiratory gymnastics in order to maintain the elasticity of the thorax and strengthening of the inspiratory muscles (rhomboid, small pectoral); vertebral gymnastics for the correction of the cervicodorsal spine deformation; mobilizations of the thoracal spine, especially, through extension exercises; cervicodorsal-lumbar asuplizations; strengthening of the abdominal muscles, paravertebral (spinal arrectors), pectoral and cervical muscles.

The orthopedic treatment assumes the removing of physical effort on the spine by resting, fixation in hyperlordosis with gypsum corset, then Boston or Cheneau, for approximately 2 years, which allows the achievement of the treatment in ambulatory conditions. Simultaneously, the muscular re-education is performed, in order to prevent the atrophy of the spinal muscles, the administration of a rich diet in vitamins and microelements is also recommended.

Results

The research which represented the hereby study object was performed on an experimental lot of 35 subjects (24 boys and 11 girls) of different ages, with the diagnosis of juvenilis osteochondritis, the selected subjects coming from

the Specialized Ambulatory of Medgidia Municipal Hospital - Medical Office of Orthopedics Traumatology. The lot complied with the rate in the general population, i.e. a ratio of 2/1 boys/girls of osteochondritis occurrence.

The subjects have been tested for three times (initially, intermediary and finally) concerning the volunteer motive capacity level. It resulted the assessment of the motive functional level, based on the special sheets. In order to emphasize the progress, I have used the graphic representation of the motive functional level of the lower extremity and the upper extremity. The graphic representation was made based on the results obtained after filling in the assessment special sheets.

The result of the working sheet

I have registered with "0" the normal movement level or the width of the movement in the target joint (the closest to the osteochondritis area) and with "-" the deficiency, in degrees, of the physiological width of the damaged joint. Thus, the following results are to be taken into account.

For the lower extremity, the graphic representation of the motive functional level is as shown in chart 2:

- General recovery between 0 and -5° of mobility, width, force and muscle tonus (evolution in 80% of the cases from the research lot) – it overlaps to an ideal I degree osteochondritis, with early diagnosis and almost full compliance of the patient;
- Recovery between -5° and -10° for II degree osteochondritis (pain that temporary persists after quitting the physical effort) in the same ideal conditions of implication of the subject (evolution in 10% of the cases from the research lot);
- Recovery between -10° and -20° for III degree osteochondritis, clinically characterized by quasi-steady pain, present even when resting, almost an invalidate character, and radiological by multiple fragmentation of the growth bone nucleus. Evolution registered in 10% of the cases introduced in the recovery program.

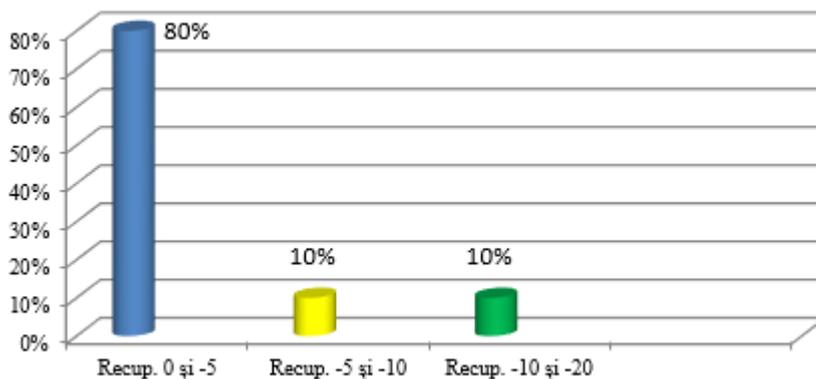


Chart 2. Graphic representation of the functional motive level

To be mentioned the fact that, the recovery percentage also depends on age, weight, origin environment, financial status of the family, intelligence quotient, practice of a sport, compliance with the treatment (for example, girls are more compliant, accommodating and persevering) and the observance of the program h-H-h (home-Hospital-home), i.e. the continuation of the acquired kinetic program home-hospital (or kinetic gym) - home.

Concerning the efficiency of the kinetotherapy in recovering the damaged upper extremity by a form of osteochondritis (humeral head, elbow) I have noticed that this is more decreased:

- - 70% for a recovery between 0 and 5°;
- - 30% for an arthro-muscle recovery between -5° and -20°.

The result is partly explained by the ratio principle of 2/1 of the small/big joints, which states that the period when the articular stiffness occurs is twice smaller in case of small joints, and twice bigger for the pasive-active mobilization in recovery.

Discussions

When analyzing the obtained data, one may say:

- all the observed subjects have registered progresses in recovery, no matter the level of beginning, age, sex etc.;

- the therapeutic result depend on the prematurity of the diagnosis, by the appeal ability at a specialized service, evolutionary level, compliance of the patient, type of osteochondritis;
- the evolution of the recovery and the time needed for reintegration in the sport life depends on the evolutionary level when beginning the kinetotherapy, the location of the osteochondritis, the child's weight, sex (the evolution is better at girls);
- the onset age is in proportion of 80% of the cases, around the age of 8-9 years old, the explanation being provided, probably, by the intense metabolic changes that occur at this age, by the frank tenderness of the growth cartilage, by the overload of some immature bone structures.

Conclusions

It is certified that the kinetic means have an important contribution at the recovery of the children with juvenilis osteochondritis, these being present all the time in the treatment plan of the observed subjects. The administration of the recovery kinetic means, combined with the electro-therapy, ergo-therapy, as well as the combined drug therapy and, sometimes, the surgical therapy, favors the recovery.

Experimental conclusions.

The best results are obtained where the kinetic treatment is the most premature; the recovery gains are important during the treatment, but they are easily lost, once its quitting, fact that recommends the administration at home; the validation of the kinetherapy integrative principle: home-Hospital-home (h-H-h); the compliance is defining in the healing result. Thus, it is very important, where possible, both the patient and his family must be aware of the effort that they have to assign to the recovery program.

The proposals can be systematized as follows:

- The kinetic treatment is recommendable to be administered immediately after establishing the diagnosis that is suggested to be set as premature as possible;
- It is necessary that the assessments to be performed periodically;
- The ensurance of an alternation of the exercises within the program, so that some movements that are to be performed, to be inter-determined or favorised;
- Periodical hospitalizations associated with a continuity of h-H-h (home-Hospital-home) type when performing the kinetic programs.

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Leisure Time Management and the Importance of Engaging in Physical Activities

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Abstract

Leisure time is undoubtedly one of the most dynamic fields, lately indicating an unprecedented development in what concerns the wide range of physical exercises. Spare time occupies an important place in the long history of humankind and it became an indispensable condition for the enrichment of human personality. Gradual familiarisation of the students with the systematic practice of out of school physical exercises and movement activities implies shaping, awareness and active engagement. Thus, physical education gains a projective-formative aspect, which among the other educational factors (family, school) makes their actions convergent.

The aim of the study is to develop the awareness of the importance of practicing different types of physical activities among middle school students. The engagement in physical exercises during their free time represents a real challenge for students as they usually struggle with these sorts of requirement for various reasons.

The primary research methods used in this paper include the literature review and the observation, methods that pointed out not only the current scientific and technical development, but also the guidance and monitoring of students during the given program of physical exercises. The results of the studies showed that spending leisure time implies different options. Furthermore, practicing physical activities offer lots of benefits that improve cognitive and physical health. The conducted study also revealed that students that were trained to engage in physical activities became aware of the benefits and this encouraged them to avoid vices and other factors that could affect their quality of life.

Keywords: Education, Sport, Leisure Time, Spare Time, Free Time, Health

Introduction

The importance of practicing physical activities in one's spare time. Spare time domain is, most certainly, one of the most dynamic domains, lately marking an amazing growth in what concerns the offers of practicing physical activities. Modern society, through its cultural mutations, has imposed many leisure models, as a general accepted term, influenced by the social frame, traditions, moral and religious values, etc. The common characteristic of these models is represented by the individual aspirations to dispose of one's time in a much more personal manner.

Sharing the view of Mileacova E.V., Dorgan V.P. and Vashchenko M.A, we hold the opinion that the period of childhood represents the main stage of life regarding the development and growth of a person's nature, from the intellectual and psychological changes to the physical ones (Mileacova E., Dorgan V., Vashchenko M., 2018).

Free time is not an unfilled time, a time with no activity at all. This has played a very important role in the history of mankind and it has become an indispensable condition for the enrichment of human personality. The importance of using one's free time grows proportionally with shortening the working hours and work automation. Technic development conducts to a limited dynamic activity, physical work is a lot diminished thanks to the existence of the automatic machines. Statistically, nowadays' people exercise a lot less than in the past decades. The decrease of physical activity is compensated by the growth of intellectual activity. Thus, spare time appears a lot more as time for multilateral development of one's personality, which assures intellectual, moral, esthetic, and physical perfection.

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Conceptual issues.

In nowadays conception, independent physical activities get two fundamental aspects: practical utility and the fight against tiredness and the indubitable pleasure of pupils towards physical practice. Exercising can be combined with a pleasant way of spending free time, outdoors, using games, sport activities and tourism. If spare time is correctly used, it becomes a way of shaping the human personality, of continuous self-education. Physical activities may be practiced individually or organized with colleagues, friends, family, as a noncompetitive form like walks, trips, dynamic games, swimming, etc. but also as the form of competitions. It is important that these sportive and physical education activities become part of the daily program of each pupil. Gradually getting students used to systemic practice of physical activities and exercise outside the school means shaping, awareness and active participation. Thus, physical education gets a projective-formative character, which together with the other educational factors like family and school, make that their actions be convergent.

Education from the perspective of independent practice of physical activities

The lack of physical activity and an inappropriate diet lead, incontestable, to gaining weight, favor the apparition of obesity and some chronic disorders, like cardiac diseases and diabetes, which affect the quality of life, endanger people and create problems to the economy and health budget (The White Book of Sport, The European Communities' Committee 2007).

Young people's psychometric education, must be understood and approached in all its complexity, and the awareness of one's body, in relation with its segments, and also their space positioning. It must be treated as a permanent habit, as a result of the consensual participation between the psychic intercession and that of the motric finality. The issue of the psychometric development of students has to be followed by all intercessions and to aim one's capacity to form an accurate image of one's body, differenced in head, torso and limbs.

In his book, *Psihologia educatiei fizice*, M. Epuran defines the main objectives of Physical Education and Sports stating that the psychomotor skill development includes:

- a. the development of motor skills such as: speed, strength, agility, endurance, and flexibility;
- b. the development of kinesthesia (the complex perception of movement);
- c. the development of motor skills and abilities: walking, running, hopping, jumping, throwing, climbing, pushing, pulling, etc.);
- d. the development of the body's ability to perform physical activities and to adapt to the required movement task (body and space control).

Psychomotricity offers to children the gesture, it offers the awareness of its own body, it situates one in time and space, it assures the capacity to lead one's moves in order to relate with oneself and with the others. The complex function of psychomotricity is underlined by the abilities that it highlights and also by the behaviour's possibilities to adapt to different situations. Psychomotricity, through its ways of acting assures the child the capacity to control the body, to improve the physical and mental equilibrium, to amplify the useful ties with objects and the connections with other individuals.

In his reference work, *Psihomotricitatea*, (C. Albu, 1999) quotes A. D. Meur, who claims that the study of Psychomotricity implies four main stages. Firstly, the research was oriented towards the problem of motor development. According to (A. D. Meur, 1998), during child development, the motor skills and the cognitive and emotional development are closely related. The concept of motor and cognitive thinking can be explained by the fact that:

- a. the movement is strongly connected to the state of mind and implies the entire personality.
- b. the psychic is closely related to the movement that controls the skills development.

Moreover, this concept also integrates the opinion of (R. Zazzo, 1990) who considers that developing the motor skills implies not only preparing the child for professional tasks, but also creating a physical and cognitive balance, giving him good control of his body and creating social interaction and relationship awareness.

The purpose of our study is that of making secondary school students aware of the importance of practicing physical activities. The proposal of practicing physical activities in their free time represents a challenge for the

students, because they oppose to such a solicitation for diverse reasons. Thus, an individualized approach is needed, to “prescribe” physical activities which have an impact on changing the behavior.

In order to determine students to practice independent physical exercises it is necessary for them and their families to get a clear picture of this field of activity, so that the concept of “sports education” is formed. This “sports education” implies the development of values and attitudes that could engage students in practicing sport both within and outside its multiple institutionalised forms.

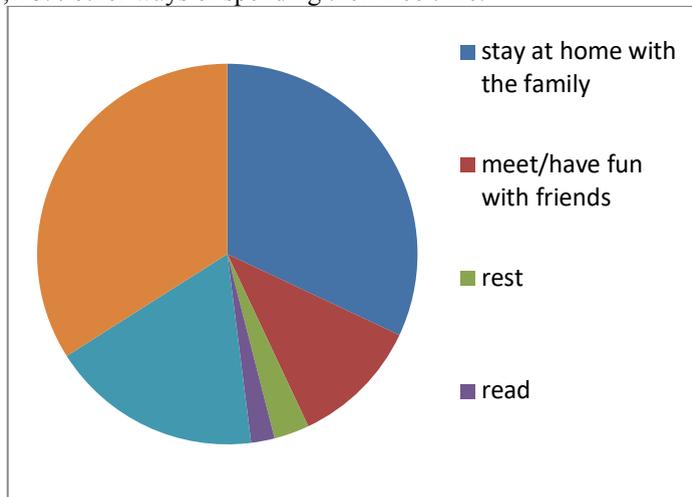
As methods of raising awareness on the importance of practicing independent physical activities we could highlight: theoretical presentations during the optional classes (Health Education), extension lessons/ lessons of studying thoroughly the Curriculum and / or enriching the content of the Core Curriculum, extracurricular activities meant to prepare students for the representative school teams with the purpose of developing the competitive spirit.

The aim of independent practice of physical activities is, mainly, that of obtaining an harmonious physical development of the body. Aside this aim, one may find a multitude of other reasons to determine students to practice physical activities, from which we mention:

- maintaining an optimal health of those who knowingly and systematically practice physical activities, and also a rise of their academic results
- the correct shaping of a wide system of motric adaptations and skills;
- the important contribution to the development of intellectual, aesthetic, moral and civic traits and qualities;
- training a habit of systematically practice of outdoors physical activities and appropriation of methodological knowledge and skills which allow the independent practice of those;
- the development of intrinsic motivation for physical education, the interest of practicing physical activity of any kind.

The primary research methods used in this paper include the literature review and the observation, methods that pointed out not only the current scientific and technical development, but also the guidance and monitoring of students during the given program of physical exercises. The fast technical progress and the rapid economic growth have a great impact over people in general and students’ lifestyle and work conditions in particular.

The studies applied in this are of interest show that choosing the way of spending ones free time is made regarding different options. A recent survey carried out during September 2011 – September 2012 by Institutul Național de Statistică (National Institute of Statistics) reveals how children aged 10-14 years spend their free time. Thus, the next answers have been obtained: 34% watch television; 32% stay at home with their family; 11% meet/have fun with friends; 3% rest; 2% read; 18% other ways of spending their free time.



Graphic no.1. The proportions of leisure time activities of the Romanian population.

From the structure of the answers for the above question, it results that Romanians prefer to spend their free time having quality time with their families rather than practicing sport and physical activities. To the same question the answers given by the Americans reveal some particularities: apart from the Romanians, the Americans prefer less having quality time with their families and meeting/having fun with friends, but they prefer more to rest, read, to go to a restaurant or to the cinema/theatre and also to do sport activities.

Chart no.1. Leisure time activities for the Romanian and American population

Leisure time activities	Romanians %	Americans %
Watching TV	34	26
Staying at home with their families	32	25
Meet/have fun with friends	11	8
Rest	3	9
Read	2	9
Go to a restaurant	2	5
Dance (clubbing)	1	1
cinema/theatre	1	5
Listen to the radio	1	2
sports	2	3
Other answers	11	7

Health is considered an extremely important resource for the social and economic development of a country. Due to the progress in human development the life span and the number of years lived have risen. The age of childhood and adolescence represents the period of maximum physical and psychic development, of shaping a lifestyle and the necessary skills to social inclusion. It is the physiological period with the biggest body modifications and a risen vulnerability, from a physical, psychical and social point of view, which will profoundly mark the future evolution of the young man

The studies made by different research institutes, in different countries, show that to each dollar invested in physical activities corresponds a discount of 3.8 dollars for medical expenses (The Declaration of Puta del Este of Education ministers, 1999). Not incidentally, there is the conception according to which “sport adds days to our life and life to our days”.

Physical activity, regarded as a way of life, improves a nation’s physical condition, thus becoming more capable to express, to explore, and to develop in a balanced relationship with the surrounding environment. Physical education addresses, simultaneously, to the body and the psychic, because the individual, moves, thinks, feels, expresses oneself. It is, in fact, a education through exercise. Intellectual abilities configure and structures motric activities, and these enrich and refine the intellectual ones.

Creating a habit of independent practice of physical activities to the young generation represents one of the key elements of the educational system of children, this aspect contributing to the preparation of a capable, healthy and powerful youth to integrate in the modern society.

Conclusions

Through practicing physical activities a multitude of benefits, which contribute to improving the quality of life from the point of view of physical and mental health, are obtained. Astfel, crește capacitatea de muncă, încrederea în sine, calitatea relațiilor profesionale și sociale cât și îmbunătățirea relaționării în cadru restrâns – familie, prieteni etc.

Sportive activities facilitate socializing, due to its specific and means that it holds- physical exercise, sportive activities organised under the form of competitions or individual sport activities.

Another positive effect of physical activities on pupils is that of considerably reducing the chance of falling into bad habits like smoking and the consumption of alcoholic drinks. A student educated from a young age in a sportive spirit, will become aware, a lot more easily, that these addictions not only lower the athletic performances but also endanger one’s life. Also, children who practice sport activities, understand, a lot more easily, what winning or losing means, and that to win it takes a lot of work, and fighting together with the other members of the team you belong to.

By stimulating the various age-related processes of development (such as students’ playful behaviour, the need to state something or to experience real competition, the harmonious physical development) we invest in the education and the development of psychomotricity related to students’ chronological age.

The engagement in physical activities implies not only the development of the mental skills, but also strategic and mathematical thinking. There are several possible explanations for this. For example, during a basketball match, the child needs to choose in a split-second the teammate he is going to pass the ball to, as well as the place he needs to get to in order to get the ball back and score. He is also going to use the basic mathematics to track of the score.

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Performance Analysis of Beginner Level Swimmers in Terms of Their Pulse, the Oxygen Saturation Level and the Results Obtained

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Abstract

The aim of this article is to analyse the oxygen saturation level, pulse and the results obtained in beginner swimming groups in order to help to select children for advanced groups. Initially, 50 children, members of the Ebihalak Cluj Napoca Sports Club, took part in the research. A number of 19 of them were selected and permanently monitored. The group of 19 children aged 7 to 12 years comprised 11 girls and 8 boys. The following studies were carried out within the research: measurement of the children's pulse and level of oxygen saturation in the blood, monitoring the progress of measured timing in training exercises and timing during competitions (each timing was measured for 400m freestyle). There was a significant statistical correlation comparing the mean for the level of oxygen saturation. From the data obtained, the hypothesis is not completely confirmed, but a coach can track the development of an athlete by monitoring constantly the children.

Keywords: *swimming, children, initiation, selection, oxygen, pulse, time, training*

Introduction

Swimming represents for children a valuable source of well-being. It increases and strengthens the muscles, strengthens the bones and helps prevent scoliosis. Physical activity performed in the water improves and strengthens the performance of the heart and the lungs (Howells, 2016). In addition, swimming stimulates due to reduced gravity and flotation the vestibular system in the ear which is responsible for maintaining balance. Swimming and playing in the pool strengthens a child's body structure as a result of stimulating muscles which are not usually used and thus helps the child maintain a correct body position (Lima & Castilha, 2017).

Swimming is a sport that is recommended for all people, regardless of their age. In today's society when children allocate less time for physical activity, this attractive sport, which is non-invasive, is beneficial for their harmonious physical development, even at very young ages.

Many children come to initiation courses in swimming because they are brought by their parents who assume or know that swimming favours children's growth, their harmonious development, it forms their character and it develops their competitive spirit. This initiation stage is a bit difficult for children since they have to get used to being in the water, to get along with the instructor and the classmates and to master and coordinate the necessary swimming techniques (Irwin & O'Callaghan & Ian Glendon, 2017).

Hypothesis

The use of appropriate training methods during children's initiation courses offers the opportunity to discover and engage children with increased potential for becoming professional swimmers.

Resources and methods

The research was conducted with beginner level children who belonged to different age groups. The research took place within Ebihalak Sports Club in Cluj-Napoca.

Initially, 50 children, members of the Ebihalak Cluj Napoca Sports Club, took part in the research. A number of 19 of them were selected and permanently monitored.

The group of 19 children aged 7 to 12 years comprised 11 girls and 8 boys.

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The following studies were carried out within the research:

- Measurement of the children’s pulse and level of oxygen saturation in the blood by using a pulse oximeter (PO60 Beurer model), after swimming 400 m freestyle
- Monitoring the progress of measured timing in training exercises, and of timing during competitions (each timing was measured for 400m freestyle)

These measurements were carried out between September 2017 and July 2018 at the "Universitas" Swimming Pool at Babeş-Bolyai University of Cluj-Napoca during controlled training activities.

1.2 Statistical data analysis

The correlated data was compared with the t student test for sample pairs and the correlation was highlighted by the Pearson correlation coefficient (p). The significance threshold of $p = 0.01$ was chosen for the correlation and $p = 0.05$ for the t test. The statistical calculations were performed in IBM SPSS and the charts in MS Office - Excel.

Research findings

Table 1. Comparing the mean for the level of oxygen saturation

Indicators	Mean difference	t test	Significance (p)
OxT1-T2	-0.21053	-1.166	0.259
OxT2-T3	-0.31579	-2.051	0.055
Ox T1-T3	-0.52632	-2.970	0.008

Note: OxT1,2,3 = the level of oxygen for the three measured instances;

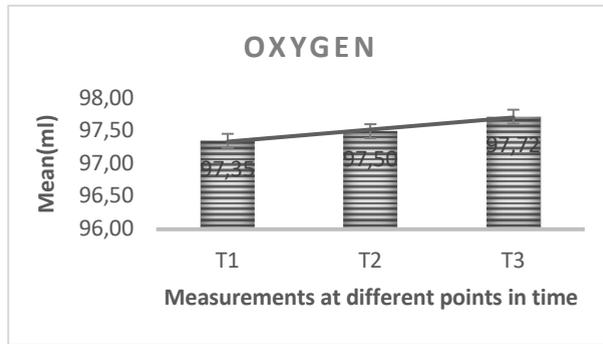


Figure 1. Oxygen saturation in the blood

Table 2. Comparing the mean for the pulse indicator

Indicators	Mean difference	t test	Significance (p)
PuT1-T2	-2.84211	-0.184	0.856
PuT2-T3	4.31579	0.255	0.255
Pu T1-T3	1.47368	0.173	0.864

Note: PU T1,2,3 = The pulse for the three measured instances;

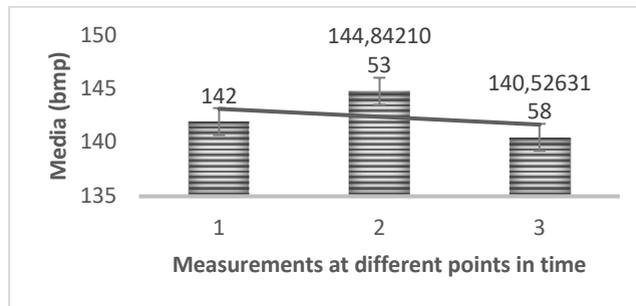


Figure 2. The measurement of pulse

Table 3. Comparing means for time indicators

Indicators	Mean difference	t test	Significance (p)
TiT1-T2	-0.34158	-0.294	0.772
TiT2-T3	1.16895	0.969	0.345
TiT1-T3	0.82737	1.516	0.147

Note: Ti T1,2,3 = time indicators for the three measured instances;

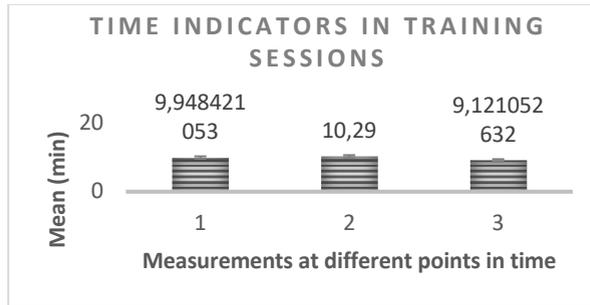


Figure 3 The time indicators measured in training sessions

Table 4. Comparing means for the competition indicator

Indicators	Mean difference	t test	Significance (p)
Con 1-Con2	.13947	.116	.909

Note: Con 1,2 = competitions

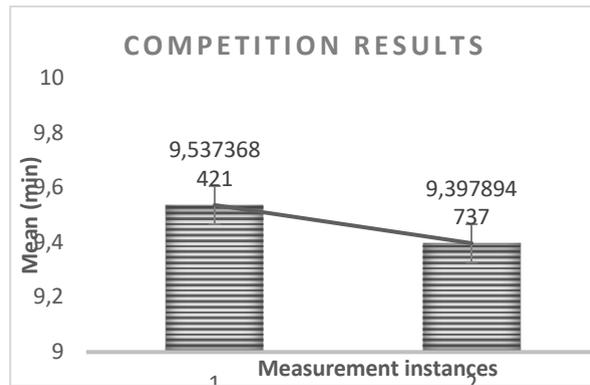


Figure 4 Time indicators measured in competition

Table 5. Correlation of physiological indicators with time indicators measured in competitions

Indicator	Competition 1 r (p)	Competition 2 r (p)	Significance
OxT3	-0.419 (0.074)	0.241 (0.319)	ns/ ns
PuT3	0.357 (.134)	-0.096 (0.697)	ns/ ns
TiT3	0.485* (0.035)	0.073 (0.767)	s/ ns

Note: OxT3 = Oxygen saturation at final testing (ml); ns = not significant correlation.; s = significant correlation; r (p) =correlation and significance

Conclusions

In conclusion, from the data obtained, the hypothesis is not completely confirmed. By using appropriate training methods a coach can track the development of the athletes by monitoring constantly the children in terms of their oxygen saturation level in the blood, the pulse and the timing performed during the control sessions. This development is very important in order to select the athletes for the advanced groups. Therefore, by analysing the results in the graphs, the coach can take informed decisions for the children who are suitable for achieving performance in swimming.

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Differences in Physical Potential Between Professional Female and Male Handball Players in Romania

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Abstract

The research aims to analyze the differences that occur between two groups of athletes at the physical potential level. Handball is a spectacular indoor game whose evolution has led to a change in the physical involvement of practitioners by increasing the speed of play and increasing the volume of the specific effort. Thus, the physical component of a professional handball game has gained increasing importance, often the better-prepared team from this point of view succeeds in imposing itself on the opponent. The research subjects are the components of two professional handball teams from the first league of Romania, the first consisting of 16 female players (28.06 ± 3.99 years, 176.6 ± 6.93 cm, 71.23 ± 8.01 kg) and the second 19 male players (23.74 ± 4.13 years, 191.0 ± 7.25 cm, 95.83 ± 13.97 kg). Following the application of a physical test battery to evaluate the body composition, reaction speed, running speed, agility, strength, muscle endurance, mobility, lactate anaerobic capacity and aerobic capacity, the two batches of athletes were compared to detect the differences between the two professional types of practitioners of professional handball. The battery pursued a characterization as complete as possible, by determining the level of the main motor skills, both simple and combined. The physical tests have been sustained during the pre-competitive period of each team, before they start training. Both female players and male players had experience in handball at the time of the evaluation, practicing the sport discipline of $16,50 \pm 4,16$ years, respectively $10,89 \pm 4,38$ years. At the same time, we try to outline a physical profile of the handball player from the first Romanian league, an important aspect for the growth of future generations. Children and young people with perspective need milestones to become better and have real success in international representations.

Keywords: handball, effort, capacity, female player, male player.

Introduction

One of the large-scale team games on earth is handball, with most countries having a competition system for gender and age groups. Most competitions are held regularly, continuously and in international interdependence, handball being a popular sporting discipline with world-wide ramifications. An important aspect of the game is its introduction to the Olympic Games in 1972, for the male segment, the female one taking part starting with the next edition in Montreal (Canada). With a significant history, handball has its origins in Denmark since 1897, the year around which the first historical evidence of organized conduct revolves (Andersen B, 1997, pp. 1-210). Initially, the game was addressed to the male segment, but it did not last long, and the year 1905 represents the start of handball in the female sphere. With origins in the Scandinavian region, handball has returned to the home countries many trophies and titles at continental and world level.

Handball is a contact game and requires a high level of effort, both individually and collectively. Today, the game requires a high availability of players, especially from a physical point of view, if we consider the tactical component that has evolved a lot. The last few years have brought in an increase in physical effort in the two 30 minutes halves of actual play, coupled with increased speed and increased acceleration, sprints, jumps, throws, quick changes of direction and player contacts (Michalsik LB A. P., 2011 (A); Michalsik LB A. P., 2011 (B); Michalsik LB A. P., 2013; Michalsik LB M. K., 2011; Michalsik LB A. P., 2011 (C)). All these specific actions are executed in accordance with the tactical momentum needs of the game.

During a calendar year, 9-10 months are dedicated to national or international competitions, a period that sometimes includes a alert gaming rhythm. Handball being a sporting branch, we can refer to the competition, which creates the conditions for improving the performance of high-performance players. This creates references for practitioners all over the world trying to reach and overcome them, an extremely important aspect for the competition perpetuation and discovering new physical limits of the human body. Creating a training plan for a handball team

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involves knowing the specific demand of the game, according to the level of training, the training conditions, the competitive system, etc.

It is known that there are gender differences in terms of height, weight, muscle mass, speed, endurance, the male category winning (Åstrand PO, 2003, pp. 237-272). The highlighted differences should not affect the game itself as long as it does not take place between genres. Between the female and the male, the ball has different sizes and weights: 450g vs. 350g. However, there is a need to know as much as possible the particularities of the female and male games, in order to create a physical training plan to improve the sporting potential at the optimal level to achieve the best results.

In line with the results of other studies conducted so far, we want to outline the physical profile of the female handball player and the male handball player in Romania. The profile integrates results of evaluations made for two groups of athletes from the first league of Romania, divided by gender. The rated athletes were active at the time of the evaluation and were active at two traditional clubs in the country. We started from the hypothesis that Romanian female handball players have a lower physical profile quantity than male players from the same country.

Material and method

Our study aims to outline the physical profile of the professional handball player in Romania, by gender, and to highlight the differences between the two categories at the professional level. Thus, we applied a test battery to two groups of athletes whose demographic data are specified in Table 1. The two study groups were called generic A and B, depending on the composition: female and male respectively. Group A has 16 professional female handball players and B 19 male players of that category. The table shows the level of experience, expressed in years, which is a factor of sports performance.

Table 1. Demographics of research subjects

	Group A	Group B
Number	16	19
Gender	F	M
Age (years)	28,06±3,99	23,74±4,13
Experience (years)	16,50±4,16	10,89±4,38
Height (cm)	176,6±6,93	191,0±7,25
Body mass (kg)	71,23±8,01	95,83±13,97

Creating the physical profile of the female and male professional handball player from Romania, we physically tested each lot individually to quantify the parameters of the characterization. The assessment was made in similar conditions, aiming at limiting as much as possible differences due to external factors. Thus, our athletes passed through physical tests on the wood floor, in the same month (August), with the same assessment devices and respecting the same protocol.

The quantified parameters were related to: anthropometry, body composition, reaction speed, running speed, agility, strength, endurance, mobility, lactate anaerobic capacity and aerobic power.

Anthropometric data was determined using a Bosch GLM80 professional telemeter and a metal set square, and the body analysis was done with the Omron BF511 body analyzer.

The reaction speed was measured using a laptop running the TreactionCo software and a floor keypad. On the screen, the software displays a red circle, and the athlete has to press a predefined key as soon as possible. The evaluation protocol is similar to that of the simple reaction speed, but only two hands were used. (Cojocariu, 2011). The reaction speed of the dominant superior member was determined (T-reaction - SUP - DOM).

The running speed of 5, 10 and 20 meters was determined by measuring the crossing time of each interval using a four gates electronic timing system (with photocells). The crossing times for the specified distances were recorded in a single run, avoiding the demand for energy resources in conducting such a test. Each athlete had at his disposal two attempts, the best times being taken into account. (Sheppard J. M., 2006)

Agility was assessed using two tests: 505 (Draper, 1985) and Illinois (Cureton, 1951). The handball game involves a series of rapid changes of direction, and these tests can objectively evaluate this ability (Sheppard J. M., 2006).

The force evaluation used tests for the lower limb explosive force, which was done with the Just Jump, as well as the isometric force of the palmar flexors. Squat Jump (SJ), Counter Movement Jump (CMJ) and Free Jump (FJ) tests were performed (Trofin F., 2017). The explosive leg power factor (ELPF) was determined by a four-jump test performed on the same device. The total force of the palmar flexors was measured using two manual electronic

dynamometers. The athlete keeps his arms wide, obliquely laterally down and tightens the dynamometers for 5-6 seconds, with the maximum recorded value displayed on each screen.

The endurance of the abdominal muscles required the maximum number of flexes of the trunk on the thighs (90°) for 1 minute.

Mobility of the spine was determined using a flexiometer from the seated position. (Mayorga-Vega D, 2014)

Anaerobic lactacid capacity is an important physical component of handball, using the 8x10 + 10m test (Trofin F, 2018).

One of the most important tests for any sport discipline, aiming at the assessment of maximum oxygen consumption (vO2max), is the VamEval test (Cazorla, 1990).

Results

As a result of applying the test battery proposed above, in order to outline the physical profile of the female and male professional handball player in Romania, there were series of data that were statistically processed in order to prove the proposed hypothesis. For each determined parameter, the t Student test was applied to determine whether there are statistically significant differences between the two groups.

The results are centralized in Table 2, their expression being made using the mean and standard deviation. Where there are significant differences, the column B is specified with ”*”.

Table 2. Differences between physical characteristics, by gender

Parameter	Group A	Group B
Height (cm)	176,6±6,93	191,0±7,25****
Body mass (kg)	71,23±8,01	95,83±13,97****
Body fat (%)	29,16±2,38	21,34±5,61****
Muscle mass (%)	30,91±1,27	37,24±5,17****
Visceral fat (1-30)	3,87±0,72	7,32±2,11****
T-reaction - SUP - DOM (ms)	387,7±62	375,9±98,74
5 m (s)	1,24±0,11	1,09±0,06****
10 m (s)	2,07±0,37	1,83±0,10*
20 m (s)	3,61±0,22	3,14±0,21****
505 (s)	2,63±0,17	2,45±0,15**
Illionis (s)	18,00±0,68	16,58±0,87****
SJ (cm)	32,83±4,51	39,02±5,54**
CMJ (cm)	33,88±4,96	42,33±5,46****
FJ (cm)	38,06±4,25	47,82±6,98****
4 jumps (ELPF)	1,99±0,34	1,84±0,40
Strength of palmar flexors - Total (kg)	70,40±8,39	108,5±14,47****
Fabdomen 60 sec (rep)	53,50±6,60	54,26±7,44
Mobility of the spine (cm)	16,62±9,03	11,57±7,21
8x10+10m (%)	6,89±5,16	6,73±4,33
VO2max (ml/kg/min)	50,18±4,44	57,61±5,43***

(mean ± standard deviation; * - p<0,05; ** - p<0,005; *** - p<0,0005; **** - p<0,00005)

The data presented in Table 2 outlines the characteristics and capabilities of a female and male player from the first league in Romania. The profile falls within two limits: the lower one, represented by the difference between the mean and the standard deviation, and the upper one, formed by the addition of the two values. Thus, three images of the professional handball player can be created: the weak player, the average player and the top player.

By applying the t test for each parameter, statistically significant differences in each comparison were observed, except for the reaction speed of the dominant upper limb, the lower limb explosive power factor, abdominal endurance, spinal column mobility and lactate anaerobic capacity (8x10 + 10m). The rest of the results differentiated group A of B, qualitatively, in favor of the second group, except visceral fat. Thus, handball male players have a physical advantage over female players of the same level.

Reporting to our proposed model can be a benchmark for handball practitioners to improve sports performance and improve individual weaknesses.

Discussions

Our study aims to outline the physical profile of the professional handball player in Romania, by gender, and to highlight the differences between the two categories. We consider our sample representative because the two groups of athletes had a ranking in the first half of the domestic championship at the time of the evaluation.

In the literature, there are various reports on the effort capacity of male and female professional handball players to work hard. In the present study we can compare the results obtained by our subjects with those presented by other authors. These comparisons are limited by factors such as: the geographical area, the level of athletes evaluated, the assessment protocol, the test equipment, etc.

A group of female athletes aged 23 ± 4 years and a height of 175 ± 6 cm present in the precompetitive period a body mass of 69.6 ± 8.4 kg and $21.1 \pm 5.3\%$ body fat (Granados CM, 2008). By comparison, the female players in our study had higher body mass (71.23 ± 8.01 kg) and a higher body fat content with about 8 percent. On the male level, a lot of Serbian players recorded values of 188.16 ± 0.81 cm, 86.63 ± 0.87 kg and $12.41 \pm 0.08\%$ body fat. (Popovic, 2012). The height and weight of group B subjects are close to the results of Serbian handball players, but the body fat is much higher than the mentioned benchmark ($21.34 \pm 5.61\%$).

The visceral fat (that from around the internal organs) has a higher level in group B than group A. This becomes interesting, given that women have more adipose tissue (Reeser, 2005).

Reaction speed is an important parameter in the handball game, with a better development in male players than female players (Dane, 2003). In our case, the response to a visual stimulus is close as a value for both groups studied.

A group of 15 Spanish male handball players had $13.8 \pm 2\%$ adipose tissue in a study and ran 5 m in 1.03 ± 0.05 s and 15 m in 2.46 ± 0.09 s (Gorostiaga, 2005). In another group of professional female players, of the same nationality, obtained for a distance of 5 m $1,10 \pm 0,05$ s, and for 15 m $2,64 \pm 0,09$ s (Granados C. I., 2007). Our athletes record lower average values for the 5-meter distance.

For 10 m, results of 2.02 ± 0.16 s have been reported (Buchheit, 2009), which are obtained by athletes mixed as gender, which is why they are among the results of our study. On the distance of 20 m, the subjects of the two groups obtained statistically significant values of 3.61 ± 0.22 s and 3.14 ± 0.21 s respectively.

15 professional players from the first Turkish league ($25,14 \pm 4,42$ years, $188,79 \pm 6,90$ cm, $92,5 \pm 11,52$ kg), following the 505 and Ilionis tests, achieved $2,69 \pm 0,17$ s and 23.83 ± 1.39 s respectively. Our athletes have achieved better results for both tests. The same players obtained for the sprint test 10 m 1.64 ± 0.08 s, and for 20m 2.97 ± 0.15 s (Aktuğ, 2018). In both tests, Group B lost the duel of the results.

A top Portuguese player has $10.53 \pm 5.46\%$ body fat, $46.66 \pm 4.63\%$ muscle mass, a height of 36.56 ± 5.00 cm at SJ and 38.72 ± 4.67 cm at CMJ (Massuça, 2014). Group B apparently had better results in testing the explosive strength of the lower limbs.

The explosive force of two batches of female and male players in Norway generated results at SJ of $25,80 \pm 4,27$ cm and $30,11 \pm 6,56$ cm respectively, and CMJ $26,80 \pm 4,33$ cm respectively $32,81 \pm 5.46$ cm (Ingebrigtsen, 2013).

A group of 44 Tunisian first league players (21.98 ± 3.24 years, 85.16 ± 20.29 kg, 181.83 ± 5.82 cm) obtained for SJ, CMJ and FJ values of 32.10 ± 3.14 cm, 34.16 ± 4.47 cm, respectively 38.05 ± 4.69 cm. Maximum oxygen consumption was 50.45 ± 3.81 ml / kg / min (Moncef, 2012).

The explosive leg power factor follows the reactivity of the legs during contact with the ground when the athlete performs repeated vertical jumping. Between the two genres there is no significant difference.

The palmar flexor force is an indicator of muscle development developed by the forearm and at the same time a means of monitoring the athletes' fatigue. The difference is categorical, to the detriment of Group A.

The endurance of the abdominal muscles plays an important role when the athlete performs movements in the air for a longer period of time. Practitioners of handball fall into this category, the type of our athletes not influencing the number of reps done in a minute.

Players from the first Turkish league (24.0 ± 5.7 years, 87.6 ± 9.0 kg, 185.1 ± 6.5 cm, $16.6 \pm 3.6\%$ body fat) were studied which reached 36.5 ± 4.5 cm at SJ, 37.7 ± 3.7 at CMJ and 46.6 ± 4.1 cm at FJ. The same players achieved 21.8 ± 8.7 cm in the spine mobility test, similar to ours (Nikolaidis, 2013). Mobility of the spine of our subjects is reduced compared to the above result but undifferentiated between groups.

The anaerobic lactacid capacity is the ability of the athlete to work with oxygen deficiency during the maximal effort. The synthetic result of the $8 \times 10 + 10$ m test does not indicate statistically significant differences between our study groups.

Maximum oxygen consumption is a decisive parameter in sports selection. A group of French players at national level had $13.2 \pm 0.9\%$ body fat and a maximum oxygen consumption of 57.7 ± 3.1 ml / kg / min (Rannou, 2001). This value is close to our results.

The comparison with our results is complicated because the rating protocol and the characteristics of the athletes differ. Instead, we can outline a physical profile of the female and male professional handball player in Romania, which can be complemented with other features and updated at any time.

Conclusions

As we expected, through the hypothesis formulated, male handball players in Romania have a superior motric capacity than female players of the same level, as demonstrated by numerous studies over time. The previous statement concerns professional athletes from the first league in Romania.

However, there appear to be no significant differences between genres, at: the reaction speed of the dominant upper limb, the inferior limb explosive power factor, abdominal endurance, spinal mobility and lactic acid anaerobic capacity.

Comparison with athletes from similar studies in other countries warns us that we can do even better, physical training being a component of sports training that must be fully scientifically addressed. It seems that the Romanian male and female players have adipose tissue in addition to some international landmarks, which may raise questions about the food behavior of the Romanian athletes.

Physical evaluation of athletes is a sensitive point in monitoring sport performance, and the factors that can influence it are numerous and diverse. Starting from the atmospheric factors to the athletic moment, any aspect can become decisive in achieving a sporting result.

Our paper can become a landmark in the growth of future performance athletes, the condition of success being regular monitoring, updating of the landmarks as often as possible and continuous overcoming of the human limits achieved.

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Effects of Dry Land Strength Training on Swimming Performance in the 50 M Freestyle Event in Young Girls

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Abstract

The aim of the present study was to evaluate the effects of strength training on dry land upon the swimming performance. Eighteen girls, who train three times a week were selected and divided into two groups according to the best times recorded for the 50 m freestyle event: 64,8 sec. ($\pm 3,301$) sec. for the control group (S1 n = 10) and 68 sec. ($\pm 4,10$) sec. for the experiment group (S2 n = 8). Group S2 took part in specific training sessions in the water and on dry land as well. Group S1 took only part in training sessions in the water. The training sessions in the water approached a predominantly aerobic effort for the freestyle stroke. VO₂ max. recorded a significant improvement both in the data comparison of S1 and S2 ($p < 0.05$), and when the two moments were compared, initial and final in the case of the experiment group. The relevance of the modifications occurred regarding VO₂ max. is still unclear, as some studies suggest that a good management of body weight is more directly responsible for performance.

Keywords: swimming, performance, training, velocity.

Introduction

Performance in short swimming events is influenced by biomechanical, anthropometric and physiological parameters (Lätt et al., 2010; Vitor and Böhme, 2010), and it depends on muscle strength and power (Morouço et al. 2012). Various methods and tests proved that muscle strength and power during swimming are correlated to the swimming velocity (Hawley et al., 1992; Morouço et al. 2012; Nasirzade et al. 2014). This is why the active muscles need to be able to generate powerful contractions, from which maximum mechanical power shall result (Kumagai et al., 2000; Stager and Tanner, 2005).

In this respect, strength and velocity are the factors influencing power and they are thus part of training programs for sprint events (Girolid et al., 2006). Plyometrics (Bishop, et al., 2009; Potdevin, et al., 2011), classical strength programs, alongside electro-stimulation (Girolid, et al., 2012), or strength programs in the water with added resistance (parachute) at sub-maximal and maximal velocity (Schnitzler, et al., 2011) are the programs effecting in improving swimming velocity in sprint events.

The biochemical properties of the muscle are relevant for its capacity to perform maximum contractions (Barany, 1967), whereas the physiological parameters of effort, like heart rate (HR), blood pressure (BP), systolic volume, cardiac output (CO) rise in direct proportion to the intensity and volume of effort on dry land and in the water as well (Drăgan, 2002). The HR is reduced due to the hydrostatic pressure, according to the depth where the swimmer is located (Driver et al. 2004; Pop, 2013), but also influencing the oxygen pressure (O₂) (Derion et al. 1992; Brody and Geigle 2009). Thus, the maximum O₂ intake (VO₂ max.) in the case of a young swimmer with regular training experience aged 7-8 years can reach 1.2 l/min (Maglischo, 1993). Nonetheless, there are studies suggesting that the muscle architecture (like for instance length of the muscle fiber) plays an important role in the regulation of the biochemical output (Blazevich, 2006; Sacks and Roy, 1982; Spector et al., 1980).

Even more, the differences recorded as regarding the fascicle shortening velocity of the muscle are considered to be influenced rather by the length of the muscle fiber, than by the biochemical processes specific for type I or type II muscles. (Burkholder et al., 1994).

As it is a known fact that research on young swimmers is not that common as in the case of their adult counterparts (Schnitzler et al., 2011), and if in the case of elite swimmers performance is influenced by anthropometric, kinetic and energetic dimensions, in the case of youngsters these aspects are not as relevant. We will consider that training on dry land plays an important part in improving performance in sprint events.

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Material and Methods

Twenty female subjects took part in the study (with an average age of 7.95 years (± 0.95), divided into two groups (control group (S1, n = 10) and experimental group (S2, n = 8)). The subjects train at the same swimming club and have three years of specific swimming training experience (with an average of 3.3 ± 1.1 h/week). After having informed the children and parents about the scope of the study and before they took part in the research, each parent filled in a consent form.

The study was conducted during a period of 5 weeks. Initially, the subjects underwent anthropometric measurements, where the following aspects were determined: height, weight, arm span and length of the limbs. The body height and weight were determined using the standard laboratory equipment: height meter – Taliometer ADE® MZ10017 and weight scale Model R150 A, whereas the body mass index (BMI) was determined using the BMI Excel Calculator program. The swimming velocity of each subject was determined with the help of the mathematical equation (1), containing the relationship between velocity, distance and time, whereas VO₂ was determined through the analytical method thoroughly summarized by Maglisho, 2003.

$$v = \frac{d [m]}{t [sec]} \tag{1}$$

All subjects took the 50 m freestyle event at maximum capacity twice, after having warmed up on dry land and in the water. Between the first and the second measurement there was an interval of fifteen minutes of active pause, the starting point was in the water, and the best time was recorded. The subjects were divided into two groups (S1 and S2), based on the performances reached in 50 m freestyle (the first 10 results are part of group S1, with an average of 64,8 sec. ($\pm 3,301$), while the next 10 are part of group S2, with an average of 68 sec. ($\pm 4,10$)). Two subjects were excluded from group 2 out of medical reasons. Group S2 took part in two weekly training sessions in the water, alternated with two sessions of training on dry land on different days, each at the same time of day. Group S1 participated in three weekly training sessions in the water, on different days, each at the same time of day.

The dry land training consisted of four exercises – sit-ups, jump rope, semi-squats, trellis climbing – arranged as a circuit in this order. Each training session on dry land included a warm up of 800 m jogging followed by selective influence of the locomotor system. During the fundamental part of the dry land training there were three sets of the circuit scheduled, which comprised of the four exercises indicated above in the stipulated order. The session ended with stretching exercises.

Table 1. Anthropometric Parameters

Parameters	Group S2	Group S1
	Mean value (\pm D.V)	Mean value (\pm D.V)
Height (m)	130,2 ($\pm 6,39$)	132,3 ($\pm 6,32$)
Weight (kg)	28,57 ($\pm 4,76$)	28,68 ($\pm 4,97$)
BMI	16,45 ($\pm 1,67$)	16,4 ($\pm 1,59$)
Arm span (cm)	127,9 ($\pm 6,48$)	129,12 ($\pm 7,12$)
Length upper limb (cm)	54,7 ($\pm 3,49$)	56,12 ($\pm 3,72$)
Length lower limb (cm)	76,2 ($\pm 7,18$)	78,62 ($\pm 7,02$)

Table 2. Performances reached in 50 m freestyle

Parameters	Group S2	Group S1
	Mean value (\pm D.V.)	Mean value (\pm D.V.)
Time (s)	68 ($\pm 4,10$)	64,8 ($\pm 3,301$)
Velocity (m/s)	0,733 ($\pm 0,044$)	0,798 ($\pm 0,041$)
VO2max (ml/kg * s)	2,65 ($\pm 0,19$)	2,96 ($\pm 0,197$)
	Group S2 initial measurement	Group S2 final measurement
Time (s)	68 ($\pm 4,10$)	66,2 ($\pm 4,11$)
Velocity (m/s)	0,733 ($\pm 0,044$)	0,772 ($\pm 0,087$)
VO2max (ml/kg * s)	2,65 ($\pm 0,19$)	3,39 ($\pm 0,365$)

Results

The statistic interpretation was carried out using the program IBML Statistic SPSS 20, with the help of which the accuracy of the results was tested. The following tests were used: paired Sample T-Test, i.e. a test for paired samples, and Independent Sample T-Test respectively, which verifies if an independent variable affects or influences a dependent variable (if $p < 0.05$, the null hypothesis is annulled and our hypothesis is accepted).

The charts were created using Microsoft Office 2013, after conducting the T test. The aim of the charts is to emphasize the differences between the relevant parameters (figure 1 and figure 2).

The difference between the means of the performances for the control group and the experiment group on the one hand, and the differences between the performances of the experiment group between the two measurements (initial and final) on the other hand were verified with the help of the T test. The value of the statistic coefficient (p) was positive in both cases, ($p=0.001 < 0.05$ and $p=0.003 < 0.05$ for the velocity and $p=0.002$ and $p=0.0027$ respectively for VO_2 max), values which annul the null hypothesis in the cases above mentioned.

In the case of the comparison between the performances of the control group and the experiment group, the T test was conducted after having ended the strength trainings. As a result of the conducted tests, the values of the p coefficient were 0.02, 0.012, i.e. below 0.05, which indicates that the test was positive in this case, from the viewpoint of velocity and from the viewpoint of VO_2 max as well.

As resulting from table nr.1 and table nr. 2, group 1 records better times at the initial measurement as compared to group S2 with statistic coefficient $p = 0,003 < 0,05$ and the hypothesis that taller subjects record better times as compared to shorter subjects is accepted. In the case of the final measurement, the anthropometric aspect height does not have such a major influence on the performance and the test is negative ($p = 0.532$).

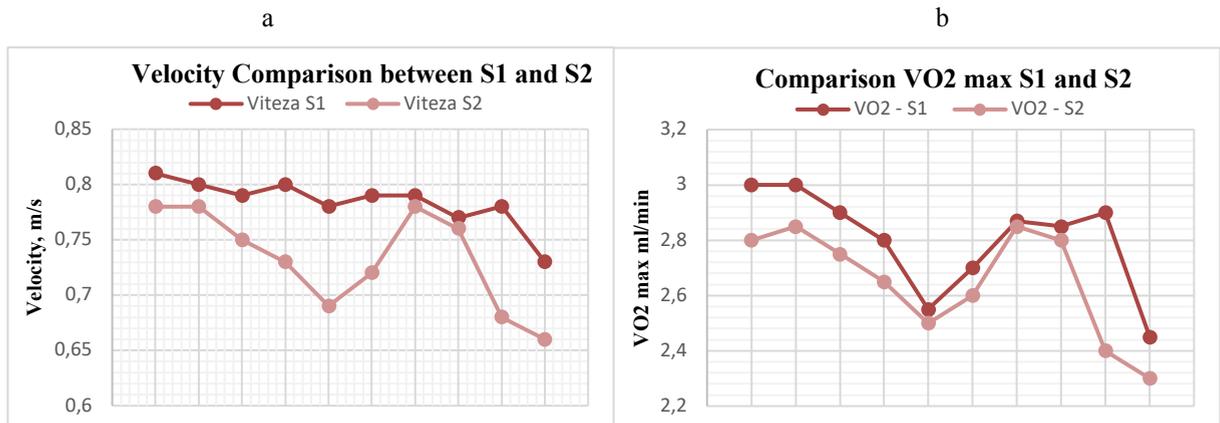


Fig. 1. Comparison of the parameters between the two groups S1 and S2
a – velocity; b – VO_2 max.

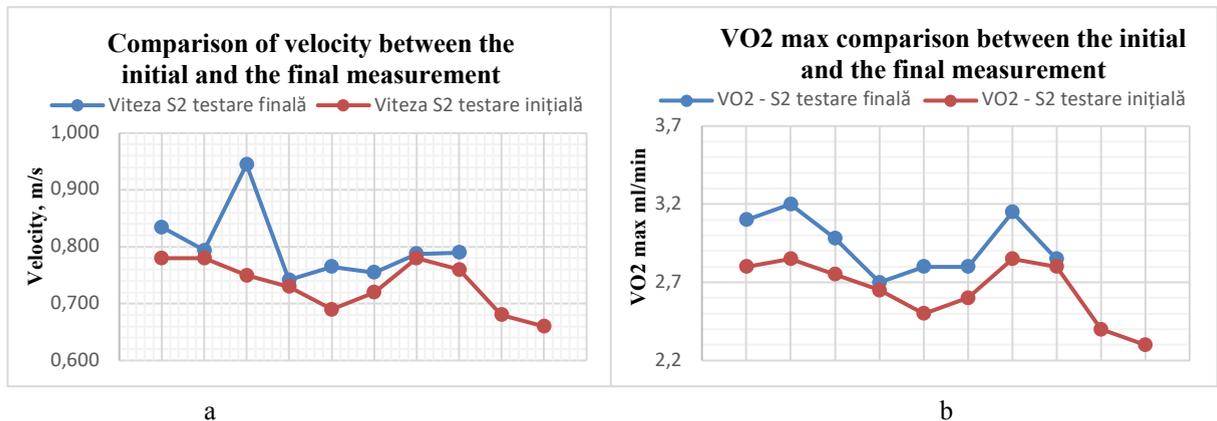


Fig. 2. Comparison of S2 performances between the initial and the final measurement
a – velocity; b – VO_2 max.

Discussions

The aim of the study was to prove the link between dry land training and performance in the 50 m freestyle event for children in the pre-puberty period.

The results show significant modifications of velocity between the recorded values for the two groups (S1 and S2) after the experiment period. Also, significant modifications of VO_2 max. were recorded in the case of S2 between the values recorded within the initial measurement as compared to the final measurement.

Performance in swimming is ensured through an optimal level of strength and power (Newton et al. 2002), and it

stands in direct proportion to the capacity of generating propelling force (Vilas-Boas et al., 2010). This is why strength training sessions are common in swimmers' trainings (Aspenes et al., 2009; Garrido et al., 2010), even though the effects described by the specialized literature are controversial in this respect (Tanaka et al., 1993; Trappe & Pearson, 1994; Giroid et al., 2007).

Many experts claim that the positive effects of dry land strength training are reduced in comparison with the negative effects produced by gaining muscle mass and friction surface implicitly, and thus reducing the range of motion (Newton et al. 2002).

Prior studies investigated the evolution of velocity, as a result of combined training (on dry land and in the water). Working through the limitations given by starts, turns and subsequent gliding of the two phases, for the evaluation of the swimming velocity in 50 m freestyle events an improvement of performances is recorded at different ages in mixed groups (girls and boys) 16.5 ± 2.5 years of age (Giroid et al., 2007), 17.5 ± 2.9 years of age (Aspenes et al., 2009), or 12.0 ± 0.78 years of age. Nonetheless, no such results are recorded at pre-puberty ages. (Garrido et al., 2010).

In the case of this study, dry land training included less analytical exercises as compared to what some studies suggest for adult athletes (Crowe et al. 1999), but who also have their limitations (Morouço, et al., 2012).

The exercises suggested and their performance as a circuit, were meant to develop muscle strength (Toussaint, 2007) and they contain specific swimming movements (Maglischo, 2003). Also, being aware of the effects of warm up, which can influence performance, especially in short distance events at maximum intensity (Neiva et al., 2012; Balilionis et al., 2012), we resorted to warm up and active pauses with moderate effort in the water in between the two measurements.

VO₂ max. determinations show improvement in all members of group S2, nonetheless, we do not consider that the results recorded were influenced by this evolution of VO₂ max. (Maglischo, 1993).

Conclusions

The results obtained suggest that the swimming velocity in short events can be influenced through circuit training sessions on dry land in girls 7-8 years of age. Differences from an anthropometric point of view proved to be insignificant at the final measurement, also warm up and active pauses appeared to be efficient in obtaining superior performances.

The relevance of modifications occurring with respect to VO₂ max. is not yet clear, as some studies suggest that a good management of body weight is rather responsible for performance than the rise of VO₂ max. values. In our case this parameter was lower even as compared to the initial measurement, but with no statistical relevance. This is the reason why we intend to monitor this parameter more closely in our future studies.

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Amplitude of Motor Parameters in Children with and without Mental Disability

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Abstract

There have been discussions about Romanian specialists' competencies, about the fragility of the material basis, and mostly about the lack of a real social protection of students with special educational needs. This fact demands a type of creative new approach on the problematic of recovering children with mental disabilities. It is this aspect that made us choose this theme, starting from the idea that the game, as form of psychic-physical, behavioral and relational manifestation, may have a strong influence, if rigorously organized and effectively directed, upon the recovering and the social-professional integration of the students with mental disabilities of all kinds. The aim of the research was to evaluate the phenotyping of motor parameters in children with and without mental disability in order to characterize the morpho-functional normality and its disturbances. Hypothesis: Children with mental disabilities have affected the values of motor parameters. In our research we applied the following tests: 30 m speed, toe blade throw, long jump, and maximum driving force on the lower train on a sample of 35 subjects with and without disabilities aged between 11 and 17, from three Special Education Centers and a Normal School from Iasi, Romania. Generally, there was a higher level of motorcycle in the group of normal children, compared to the groups of mentally disabled children, in most of the samples tested, with the exception of the maximum force on the lower train, where the group of children with mild mental disability registered a result better than the group of children without mental disability.

Keywords: motor parameters; mental disability; Down syndrome

Introduction

Disability is a complex and dynamic process that presents considerable challenges for data collection. The first step towards producing good indicators of disability is to have a clear definition that can be operationalized in a quantitative data collection instrument, such as a survey or census. The definition of disability has changed over time and is currently conceptualized as the outcome of the interaction between a person with a functional limitation (difficulties doing basic activities) and an unaccommodating environment resulting in the inability to fully participate in society. In the past, in part due to the complex nature of disability, measures of disability have either been excluded from data collections or have varied widely both across countries and within countries across different instruments. Therefore, it is not surprising that past estimates of disability prevalence have also varied widely, depending upon the approach. (Mitchell L. D., et al, 2018). When it comes to estimates of childhood disability, across countries prevalence rates range from below one percent to nearly 50 percent depending on the methodology used. (Cappa C., Petrowski N., JNjelesani J. 2015)

Children with disabilities are less physically active than children without disabilities. They also participate less in community-based sports or active recreational programs than do children without disabilities. Limited participation in sports and recreation programs may be due to the multiple environmental, attitudinal, and societal barriers that exist for children with disabilities (Fragala-Pinkham M., Margaret E. O'Neil, Stephen M. Haley, 2010) but first of all they are caused by the low level of development of motor parameters. The decrease of muscular tonus in the legs may determine intensifications of the postural reactions in the child's orthostatic position. These postural rebalancing reactions may be diminished by toning up the legs' muscles and the help of physical exercises. (Cristina Moraru, Marius Neculaș, Raluca Mihaela Hodorcă, 2014)

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There is a relatively small body of research on the motor performance of children with mild intellectual disabilities and borderline intellectual functioning. Adequate levels of motor skills may contribute to lifelong enjoyment of physical activity, participation in sports and healthy lifestyles. (Vuijk P. J., Hartman E. , Scherder E., Visscher C. 2010)

The poor motor performance observed in children with borderline and mild ID has been suggested to be related to their impaired intellectual functioning. (Piaget & Inhelder 1966) argued that cognitive development relies on motor functioning and recent findings also suggest that motor performance and higher - order cognitive functions, e.g. executive functioning (EF), are linked. (Hartman, E. , Houwen, S. , Scherder, E. and Visscher, C. 2010)

Recent studies reveal that physical activity as well as games lead to an improvement in vital functions (Oprean A. 2012) and to achieving relatively normal body mass indexes by combating obesity (Cojocariu A. 2017)

One of the most important challenges for pediatric rehabilitation and healthcare professionals is finding ways to increase physical activity and fitness among youth with disabilities.(James A. Rimmer & Jennifer L. Rowland 2008)

Hypothesis: Children with mental disabilities have affected the values of motor parameters.

The aim of the research was to evaluate the phenotyping of motor parameters in children with and without mental disability in order to characterize the morpho-functional normality and its disturbances

Material and methods

This study included 35 urban subjects with and without disabilities from three Special Educational Centers, "Constantin Păunescu Iași" School Center, "Laurența Ulici" Placement Center Gura Humorului, "Sf. Andrei" School Center Gura Humorului , and a Normal School, respectively the National College "Garabet Ibraileanu "Iasi. Participants in this study were divided into four groups as follows: group 1 - children without mental disabilities, group 2 - children with mild mental disabilities, group 3 - children with severe mental disability and group 4 - children with Down syndrome. We should mention that at the beginning of the study, we had the consent of parents or legal guardians because some subjects came from the placement center.

Measurements

1. Speed run 30 m - Deployed on flat ground with starting legs and going to the sound. Two tests were performed and the best time was taken into account.
2. Rounders ball throw - is made with a 3-5 pitch pitch, no threshold, making two throws. The best result was taken into account.
3. Long jump - made from the threshold to the sand pit. Two jumps were made and the best result was taken into account.
4. The maximum lower body strength - out of stand, counting was done in 30 seconds.

Results and discussions

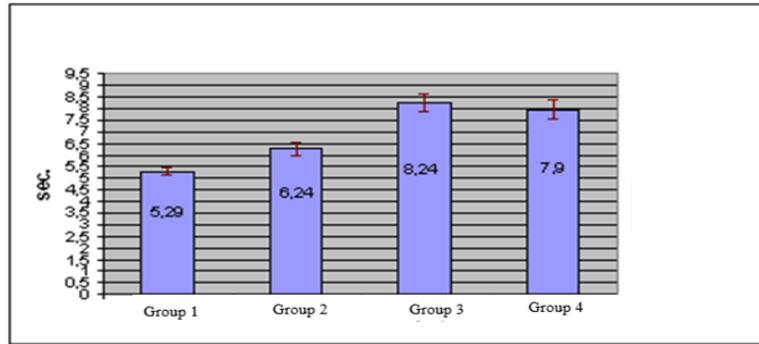
1. The values of times obtained in speed run

Table 1. Results for running speed (sec.) for children with and without disabilities

Group	N	M	M%	Std.E.	V.C.%	t	p
Group 1	10	5.29	100%	0.172	10.33	2.85	0.011
Group 2	10	6.242	117.95%	0.285	14.48		
Group 1	10	5.29	100%	0.172	10.33	6.717	p<0.001
Group 3	10	8.242	155.76%	0.404	15.5		
Group 1	10	5.29	100%	0.172	10.33	7.646	p<0.001
Group 4	5	7.9	149.33%	0.343	9.72		
Group 2	10	6.242	117.95%	0.285	14.48	4.041	0.001
Group 3	10	8.242	155.76%	0.404	15.5		
Group 2	10	6.242	117.95%	0.285	14.48	3.502	0.004
Group 4	5	7.9	149.33%	0.343	9.72		
Group 3	10	8.282	155.76%	0.404	15.5	0.545	0.595
Group 4	5	7.9	149.33%	0.343	9.72		

Legend: N - number of subjects; M - arithmetic mean; M% - percentage mean; Std.E. - average standard deviation; V.C.% - variation coefficient; t – Student test; p - significance threshold.

For 30-m speed run, the values of times obtained by the four groups have values ranging between 5.29 sec. (minimum) for the group of typical children and 8.24 sec. (maximum) for the group of children with severe mental disability (according to *Graph 1*).



Graph 1. Average values and standard errors of the four groups for speed run

Upon analyzing the values of *p* in *Table 1*, it may be noted that there are no statistically significant differences only between the group of children with severe mental disability and of children with Down’s syndrome. Upon comparing the averages of the others, it may be stated that for $0.001 < p \leq 0.01$, the groups feature statistically significant differences. The values of the variation coefficient ranging between 9.72% and 15.5% demonstrate that the groups are homogeneous.

The values of dispersion on the entire sample ranges between a minimum of 4.5 sec. recorded in the group of typical children and a maximum of 10.76 sec. for the group of children with severe mental disability. This group also records the highest value for amplitude, 4.4 sec.

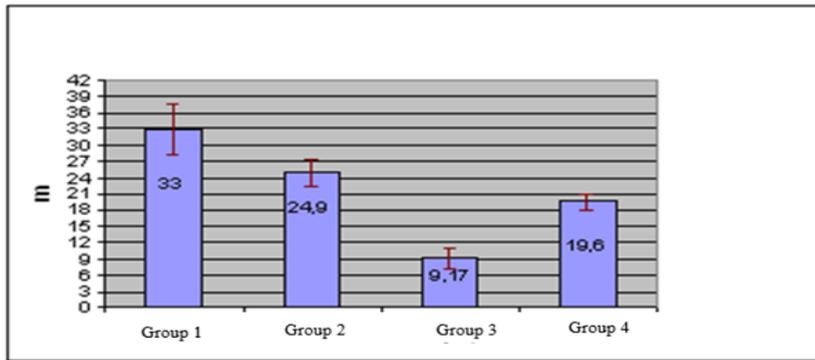
2. Results for rounders ball throw

Table 2. Results for rounders ball throw (m) for children with and without disabilities

Group	N	M	M%	Std.E.	V.C.%	t	p
Group 1	10	33	100%	4.533	43.45	1.556	0.142
Group 2	10	24.9	75.45%	2.531	32.12		
Group 1	10	33	100%	4.533	43.45	4.823	p<0.001
Group 3	10	9.17	27.78%	1.963	67.71		
Group 1	10	33	100%	4.533	43.45	2.805	0.017
Group 4	5	19.6	59.39%	1.503	17.15		
Group 2	10	24.9	75.45%	2.531	32.12	4.917	p<0.001
Group 3	10	9.17	27.78%	1.963	67.71		
Group 2	10	24.9	75.45%	2.531	32.12	4.043	0.001
Group 4	5	19.6	59.39%	1.503	17.15		
Group 3	10	9.17	27.78%	1.963	67.71	3.467	0.004
Group 4	5	19.6	59.39%	1.503	17.15		

As illustrated in *Graph 2*, in the rounders ball throw, the group of typical children obtained an average value of 33 m, while the group of children with severe mental disability obtained the lowest value: 9.17 m. The only groups between which no statistically significant differences were noted are the following: the group of typical children and the group of children with mild mental disability.

Upon comparing the averages of the others groups, two by two, for $0.001 < p < 0.02$, it may be stated that there are statistically significant differences (according to *Table 2*).



Graph 2. Average values and standard errors of the four groups for rounders ball throw

The only homogeneous group in rounders ball throw is the group of children with Down’s syndrome (VC=17.15%), the other groups being heterogeneous, with values of the variation coefficient ranging between 32.12% and 67.71% (according to *Table 2*).

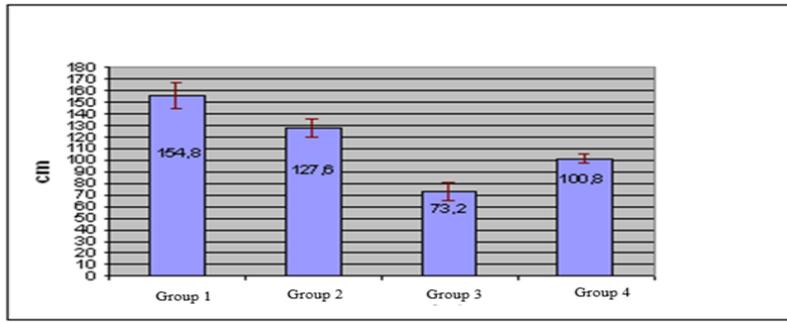
3. Data regarding standing long jump

Table 3. Results for standing long jump (cm) for children with and without disabilities

Group	N	M	M%	Std.E.	V.C.%	t	p
Group 1	10	154.8	100%	10.981	22.43	2.029	0.057
Group 2	10	127.6	82.42%	7.682	19,04		
Group 1	10	154.8	100%	10.981	22.43	5.967	p<0.001
Group 3	10	73.2	47.28%	8.151	35.21		
Group 1	10	154.8	100%	10.981	22.43	4.645	0.001
Group 4	5	100.8	65.11%	3.813	8.45		
Group 2	10	127.6	82.42%	7.682	19,04	4.857	p<0.001
Group 3	10	73.2	47.28%	8.151	35.21		
Group 2	10	127.6	82.42%	7.682	19,04	2.357	0.035
Group 4	5	100.8	65.11%	3.813	8.45		
Group 3	10	73.2	47.28%	8.151	35.21	3.067	0.01
Group 4	5	100.8	65.11%	3.813	8.45		

After calculating the averages for standing long jump, *Graph 3* illustrates that the group of typical children obtained a result of 154.8 cm, and the group of children with severe mental disability, a result of 73.2 cm. After comparing the averages obtained by the four groups, it may be suggested that there are statistically significant differences, for $0.001 < p \leq 0.05$ (according to *Table 3*).

By analyzing the values of the variation coefficient in *Table 3*, we note that the most homogeneous group is the group of children with Down’s syndrome (VC=8.45%). Good homogeneity is also featured by the group of children with mild mental disability (VC=19.04%), and by the group of typical children (VC=22.43%), the group of children with severe mental disability being heterogeneous (VC=35.21%).



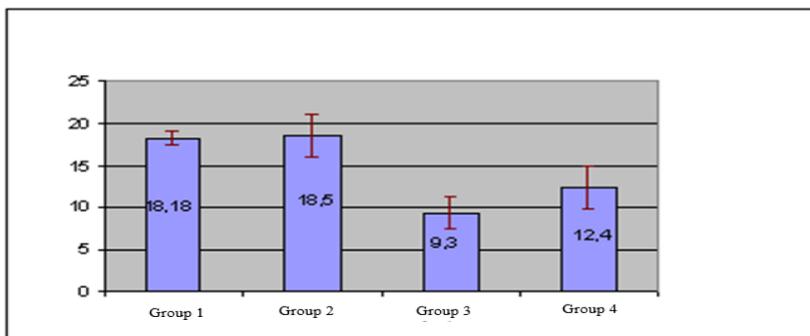
Graph 3. Average values and standard errors of the four groups for standing long jump

4. Data regarding maximum lower body strength

Table 4. Results for maximum lower body strength for children with and without disabilities

Group	N	M	M%	Std.E.	V.C.%	t	p
Group 1	10	18.8	100%	0.879	14.79	0.111	0.913
Group 2	10	18.5	98.40%	2.552	43.64		
Group 1	10	18.8	100%	0.879	14.79	4.554	0.001
Group 3	10	9.3	49.46%	1.891	64.33		
Group 1	10	18.8	100%	0.879	14.79	2.413	0.06
Group 4	5	12.4	65.95%	2.502	45.12		
Group 2	10	18.5	98.40%	2.552	43.64	2.895	0.01
Group 3	10	9.3	49.46%	1.891	64.33		
Group 2	10	18.5	98.40%	2.552	43.64	1.505	0.156
Group 4	5	12.4	65.95%	2.502	45.12		
Group 3	10	9.3	49.46%	1.891	64.33	0.965	0.352
Group 4	5	12.4	65.95%	2.502	45.12		

As it may be seen in *Graph 4*, the values of lower body strength are very close in the group of typical children (18.18 repetitions) and in the group of children with mild mental disability (18.5%). *The difference is however in favour of the children with mild mental disability*, who feature the value of 0.32 – statistically insignificant. The highest difference is recorded between the group of children with mild mental disability and the group of children with severe mental disability. With a value of 9.2 repetitions, it is statistically significant, for $p \leq 0.01$. Another highly statistically significant difference is highlighted between the group of typical children and the group of children with severe mental disability, with the value of 8.88 repetitions, for $p \leq 0.001$ (according to Table 4). The only homogeneous group is the group of typical children, with VC = 14.79%. The other groups are heterogeneous, with a value of the variation coefficient ranging between 43.64% and 64.33%.



Graph 4. Average values and standard errors of the four groups for maximum lower body strength

Conclusions

In maximum lower body strength, the highest average is recorded in the group of children with mild mental disability, 1.76% higher than the average of typical children. The two other groups have lower values than the group of typical children, 65.95% for children with Down's syndrome, and 49.46% for children with severe mental disability.

Generally, a higher motricity level was observed in the group of typical children, compared to the groups of children with mental disability, in most tests, except for maximum lower body strength, where the group of children with mild mental disability recorded a better result than the group of typical children.

A high and very high significance threshold was recorded in all tests regarding motricity.

Children with mild mental disability have recorded similar values to those of typical children.

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A New Method of Assessing the Evolution of Scoliosis

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Abstract

In recent years, numerous postural studies have been carried out due to the pain experienced by adults during office work, and, due to the increased number of children with deviations of the spine (kyphosis, lordosis, and scoliosis). In the early 90's, accelerometers were used to determine the position of the spine in the sagittal plane (kyphosis). We propose in a series of experiments the use of a device made up of 8 accelerometers for the study of frontal plane deviations (scoliosis). By attaching these devices to spinous processes, an analytical form of the column is obtained. This makes it possible to calculate the Cobb angles described by the lateral inclination of the spine. The proposed equipment was used both to evaluate scoliosis and to assess the effectiveness of position or exercise used in the rehabilitation programs.

Keywords: vertebral deviation; scoliosis evaluation, accelerometers

Introduction

The column is the central axis of the body. In the course of growth, the physiological curves in the sagittal plane are created in the spine as an adaptation of the human organism to the bipedal position. Thus, in the cervical and lumbar area, a curvature with anterior oriented convexity (lordosis) appears and in the thoracic and sacral areas a curvature with the convexity to the posterior (kyphosis) is developed. These curves are physiological, but they can be accentuated, in which cases the diagnosis is hyperlordosis or kyphosis. Sometimes these physiological curves may be reduced or even canceled and in this case the diagnosis is flat back. In the frontal plane the human spine is rectilinear. Changes by tilting the vertebrae to the side and rotation of these are called scoliosis. The Scoliosis Research Society (SRS) claims that a scoliosis is diagnosed from the moment the angle of inclination is equal to, or greater than 10°. In about 20% of cases, the cause of scoliosis is known, but in 80% of cases we are talking about idiopathic scoliosis (Negrini and co, 2018). The prevalence of idiopathic scoliosis appears in studies as between 0.93% and 3% of the global population (Negrini and co, 2016). The greatest progression of the scoliosis appears in girls, especially during preadolescence and adolescence period. Research shows that an angle exceeding 30° at the end of bone growth may have repercussions in adulthood for a decrease in quality of life, an increase in the incidence of back pain and a reduction in functional vertebral parameters (low amplitude of movements, low muscular strength).

The scoliosis protocol provides orthopedic control every 3 months and radiological control every 6 months. Childhood exposure to X-rays twice a year until bone growth is overcome is often denied by parents. Starting from this idea, the research team within the Politehnica University of Timisoara, Mechatronics Department, attempted to develop a device that could be accepted by both parents and children, a device that did not endanger the normal development of the tested person. The device designed was made of 8 accelerometers that were attached to the skin on the top of spiny apophyses. In 2001 a research team used an accelerometer prototype system to detect sagittal posture deficiencies (Lou, Bazaarelli, Hill & Durdle, 2001, Voinea, Butnaru, Mogan, 2016). Later a research team lead by Wong used a smart garment with accelerometers and gyroscope in people without column deviations to track posture changes in daily activities, and concluded that these systems can be used to warn if the wrong posture is maintained for a long time (Wong and Wong, 2008, Voinea, Butnariu, 2015). The new device made by our research team was designed to determine the Cobb angle of inclination of the spine. The Cobb angle is calculated on the radiography for every exposure and according to its magnitude is decided the evolution of the scoliosis and the treatment to be followed. The Cobb angle is calculated by drawing two tangents, one at the top of the upper neutral vertebra, and the other to the bottom of the inferior plate of the lower neutral vertebra. The perpendiculars on these tangents make a complementary angle that indicates in degrees the value of the spine deviation in the frontal plane (Pană, Roventă, Vlădăreanu, & Mihăiță, 2000). The value of this angle is taken into account in assessing the evolution of scoliosis in time.

1. Equipment and method

The equipment used in the study was made up of accelerometer sensors. The use of these sensors has some advantages: measurements can be made regardless of the age or gender of the patient diagnosed with scoliosis, the time needed for data acquisition is relatively short and is a non-invasive and painless method for the tested person .

The device is made up of eight accelerometer sensors connected to a multiplexer (to amplify the signals received), a microcontroller and a PC. Figure 1 (a) shows the schematic of the whole assembly used for testing.

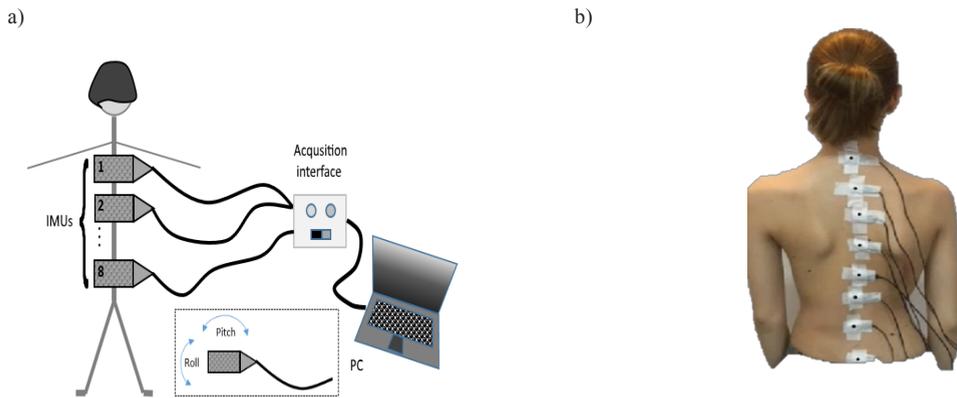


Fig.1 (a) The scheme of the equipment used in study; (b) the position of the sensors on the spine

Each sensor is attached to the skin on the top of the spinous process (fig. 1 b) and the distances between the sensors are noted for their use in mathematical calculation. Two values are picked from each unit, one for the flexion in the frontal plane (Pitch) and one for the flexion in sagittal plane (Roll). The values used in the study are those for the lateral flexion (Pitch), which will determine the degree of deviation in the frontal plane of the studied column.

2.1. Experiment number 1

For a first experiment, we studied a single-curve scoliosis with Cobb angle measured on the X-ray, a thoracolumbar angle of 15 °. The study was conducted with the consent of the parents and the subject being tested. The measurements were carried out within a medical recovery clinic in the presence of the parents. The test subject was placed in orthostatic position (the same position as the x-ray was performed). The sensors were positioned on spinous processes. From the set of values collected from the accelerometers only those corresponding to the Pitch angles were used. Various mathematical algorithms have been used to obtain an analytical form of the spine and to calculate the Cobb angle as described by its inclination in the frontal plane. Initially, an eight degree polynomial was used as a mathematical basis, resulting a Cobb angle calculated of 15.63°. After the first calculation, for validation of the measurements, the team tried to find out an easier way to compute the Cobb angle and a forth degree polynomial was used. In this case, the Cobb angle computed mathematically was 15.78 °. The mathematical method is extensively explained in the paper "Experimental Method for Dynamic Evaluation of Spine Column Deformation Exercises" published by the authors (Vutan, Lovasz, Gruescu, & Ciupe, 2017). The values of the angles obtained from the mathematical computation in comparison to the value calculated on RX are shown below in the table 1.

Table 1

Computation method	Value of Cobb angle
X-ray	15°
8 th Degree polynomial computation	15.63°
4 th Degree approximation polynomial computation	15.78°

Graphs resulting from mathematical calculations were performed in MS Excel Office 2010 through the Trendline function for the 8th degree polynomial approximation and Mathcad for the 4th degree polynomial. The graphs obtained are presented below compared to the shape of the spine observed on the X-ray.

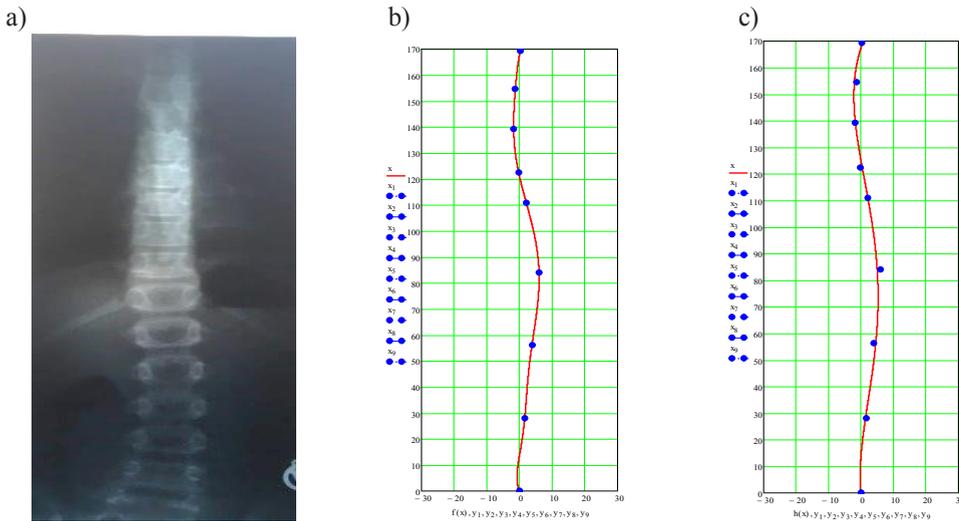


Fig 2. The comparison of the column shape on X-ray (a), mathematical model of the column calculated with the 8th degree polynomial approximation(b) and mathematical model of the column calculated with 4th degree polynomial (c)

1.2 Experiment number 2

The second experiment was performed in the case of a double scoliosis (a thoracic curvature and a lumbar curvature) for which the Cobb angle values were known. On X-ray, the radiologist calculated the two angles: 22° on lumbar spine with tip vertebra at L2 and 28 ° on thoracic spine with vertebra tip at T9. The conditions to perform the experiment were followed as in the first experiment: parent and patient consent, orthostatic position, accelerometer sensors fixed on spinous processes. To perform the mathematical calculation, the distances between the sensors are recorded and the Pitch angles corresponding to the inclination in the frontal plane of the spine are selected. Since in this case the mathematical calculation using with the 8th degree polynomial proved to be complex, it was searched a more facile way to compute the angles. After several attempts, the 5th degree polynomial was used this time to calculate the Cobb angles and the mathematical computed values seemed very similar to those calculated on the X-ray by the radiologist. The mathematical method used is extensively explained in the article "Effectiveness of Physical Exercises in the Treatment of Scoliosis-Mathematical Approach" (Vutan, Lovasz, Gruescu, & Ciupe, 2018). In Table 2 are presented the values obtained from the mathematical computation in comparison with the values calculated by radiologist on RX.

Table 2

Area of the column beeing analized	Value of Cobb angle on X-ray	Value of the Cobb angle computed with 5 th degree polynolial
Thoracic	22°	20,72°
Lumbar	26°	25,45°

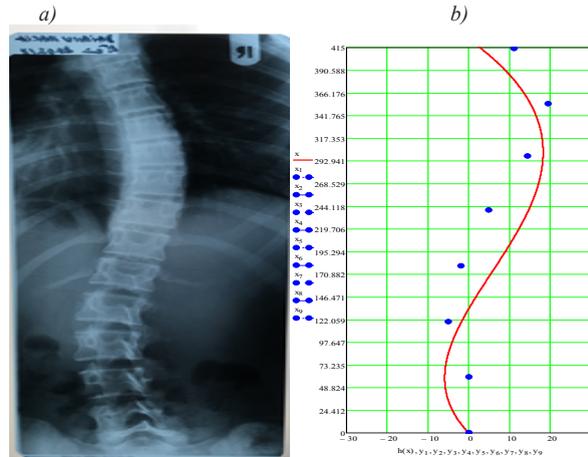


Fig. 3 (a) The X-ray of the study column; (b) The graphical model of the column calculated using the 5th degree polynomial

In the Figure 3 it can be noticed that the form of mathematically obtained curves are similar to the shape of the column described on the X-ray. The Cobb angles obtained from the mathematical calculation are very close to those calculated on RX as it can be observed in the table 2. Therefore, the research team went to the next level in terms of research in realizing a program to facilitate the mathematical computation of Cobb angles, as well as graphical representations of the spine using the 5th degree polynomial.

2.3. Experiment number 3

In order to make data processing as easy as possible and to quickly access the data obtained, an interface was created in Matlab, in which the graphical representation of the approximate shape of the column is automatically obtained and the Cobb angles are calculated directly according to the calculated inflection points. For calculating the Cobb angles in Matlab, the 5th degree polynomial was used as mathematical algorithm. The program consists of several sequences in which the accelerometer data and sensor distances that are required for mathematical algorithms are introduced into the program, after that the 5th degree polynomial is computed, the first and second derivate and the inflection points (Vutan, Gruescu, Ciupe, Margineanu, Lovasz,2018) .

Because it was desirable to access files as quickly as possible and plotting the graphs to be as easy as possible for an unfamiliar user with the Matlab program, an interface was created, which is shown in Figure 4.

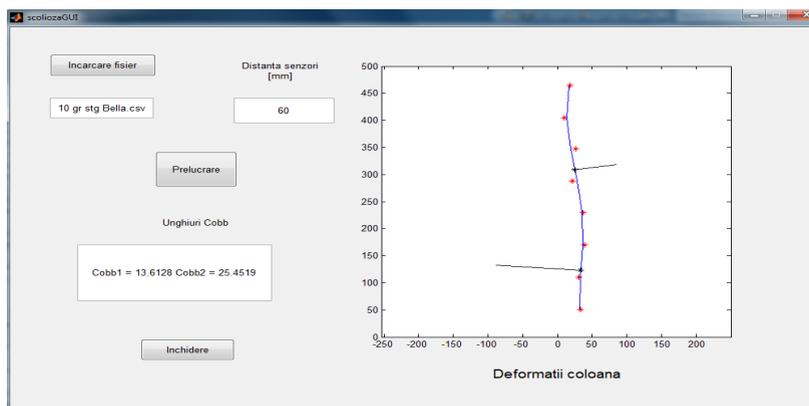


Fig. 4 The program interface in Matlab

Initially for the third experiment it was performed an analysis of the orthostatic position of the subject using the program interface. For the standing position in the case of double scoliosis used as a model in the experiment number 3, the graph of the column obtained using the interface in Matlab is represented in figure 5(b).

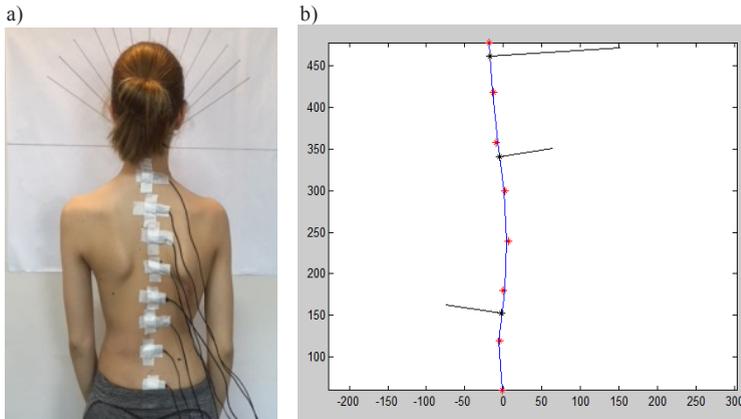


Fig.5 (a) The position of the tested subject in orthostatic position; (b) The shape of the column in orthostatic position obtained in Matlab

In everyday life, children diagnosed with scoliosis develop during their activities tilting movements towards the sides that could have a negative effect on the shape of the spine and ultimately increase the Cobb angle.

Following the Matlab data processing program that facilitates the use of data from accelerometer sensors, it was attempted to analyze changes in the spine in case of lateral inclination at different degrees. Since the data collected from the accelerometer sensors are relevant only to an angle of 60°, the positions taken by the column in lateral flexion was analyzed step 10° to the right and to the left up to 50°. This experiment started from the idea that many children diagnosed with scoliosis make lateral movements during their day activities. Also, the exercises used in rehabilitation programs are based on the inclination towards the spine convexity. In this experiment a double scoliosis that has wearing the Cheneau brace was taken into study. The experiment was carried out for tracking the changes in the spine if the subject makes right or left tilting without the brace.

It figure 6 it can be observed the way that the spine changes shape to different degrees of inclination to the right (10°, 30° or 50°).. As the lateral flexion angle of the trunk increases the inflection points change the place and the thoracolumbar area deviates more. In conclusion, for our studied double scoliosis sided thoracic to right and lumbar to the right, the tilting to the right leads to negative changes in the shape of the column, which should be avoided by the subject under test.

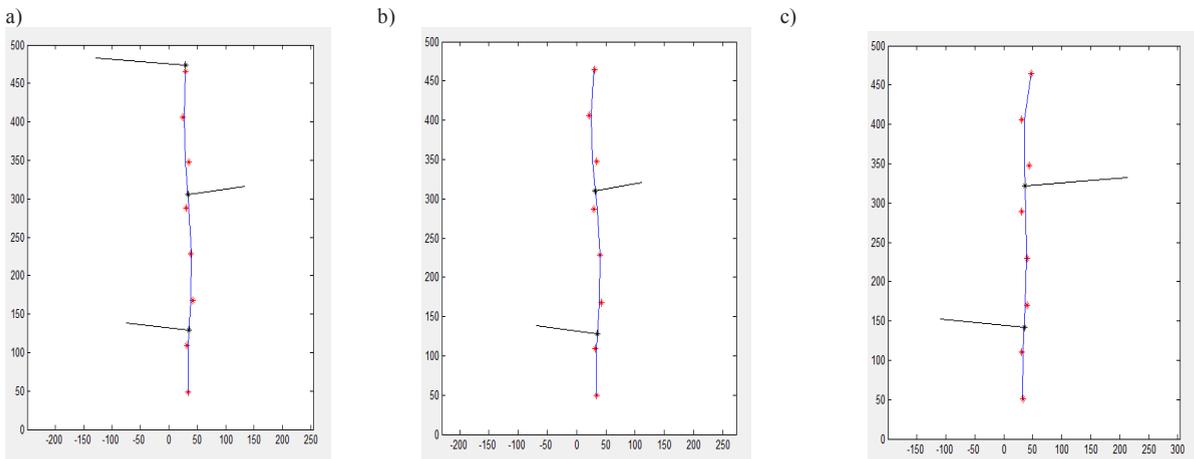


Fig. 6 Graphs of the spine obtained in Matlab for tilting to the right 10° (a), 30 (b), 50 (c)

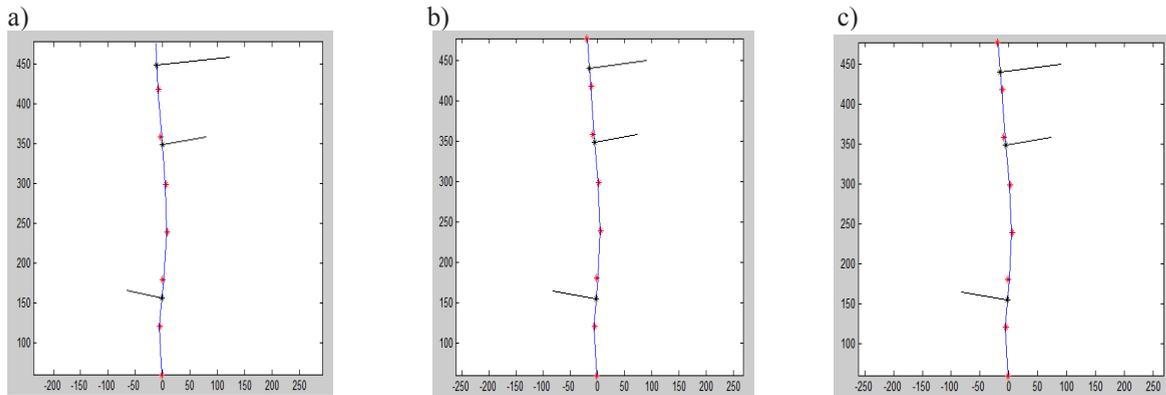


Fig. 7 Graphs of the spine obtained in Matlab for tilting t to the left 10° (a), 30° (b), 50° (c)

After analyzing the graphs obtained for the inclination to the left, it can be noticed that on the first 10° of inclination to the left there is an increase of the thoracic curvature, with a modification of the inflection points in the thoracolumbar area. At the end of the lateral flexion, 50° inclination to the left, there is a realignment of the spine.

If these split 10 to 10° lateral inclination movements are analyzed to the right and to the left, it can conclude that the corrective positions that the subject needs to take during the day activities to improve the posture are to the left side of the body with the left shoulder up to release the tension in the concavity on the thoracic area. Also, the positions in which the column presents the best realignment should be used as positions for corrective respiration or starting positions for other exercises.

It is worth mentioning that the lateral inclination positions were achieved with an axial traction (a spinal self-elongation) specific to Schroth's method of reeducation of the scoliosis. The subject tested in this experiment is familiar with the correct realization of the Schroth exercises. All tests of lateral inclination were made with the subject facing a gradual panel of 10° to 10° flexion to facilitate the control of the measurements.

Conclusions

The new method of scoliosis assessment proposed by the authors can be used to track the evolution of scoliosis over time. If the radiological examination is rejected by parents due to the negative effects of X-rays on the growing body of children, this non-invasive and painless method can be an easy-to-use alternative. We also believe that it is possible to test with this system a series of positions that the subject can later adopt during the day or one can test a series of exercises in order to choose the most effective ones to realize a more efficient individualized program.

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