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CONTENTS

HOW DO SPORTS COMPETITIONS HELP IN THE PROCESS OF SOCIALIZATION OF STUDENTS (10-12 YEARS OLD)

Ioan SOPA, Marcel POMOHACI, Dan Alexandru SZABO..... 5

FENCING TRAINING EFFECT ON MUSCULOSKELETAL FITNESS IN CHILDREN DIAGNOSED WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER

Lydia HATUEL CZUCKERMANN, Iacob HANTIU.....18

SOURCES OF INFORMATION, LOCATION AND REPUTATION OF A UNIVERSITY CENTER – KEY FACTORS FOR DECISION- MAKING TO BE TRAINED AS A PHYSICAL THERAPIST AT "VASILE ALECSANDRI" UNIVERSITY OF BACAU

Dan Iulian ALEXE, Gabriel MAREȘ, Daniela CRĂCIUN..... 30

THE INFLUENCE OF SPORTS AND PHYSICAL ACTIVITY ON THE METABOLIC SYNDROME: A SYSTEMATIC REVIEW

Adriana BAIDOG, Grigore Vasile HERMAN..... 39

RELATIONSHIPS BETWEEN R.O.C. AND I.O.C. AND THEIR IMPACT ON THE ROMANIAN OLYMPIC SPORT (1920-1964)

Alina Felicia SUCIU 46

THE TEMPORAL STRUCTURE OF THE GAME - A MODELING ASPECT IN PREPARING BASKETBALL TEAMS

Ioan FEFLEA 56

HOW DO SPORTS COMPETITIONS HELP IN THE PROCESS OF SOCIALIZATION OF STUDENTS (10-12 YEARS OLD)

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Abstract: Our study focused on observing the influence of sports competitions and motor activities on pupils aged between 10 and 12. The experiment started in september 2016 and was finished in june 2017, and had as samples two groups of children, the first group, the experimental group, consisted of 20 students aged between 10 and 12 years old, 12 boys and 8 girls, with whom we dealt with the 2 hours of physical education and sports from the curriculum and 3 more training sessions on initiation in basketball game; the second group, the control group, consisting of 20 pupils aged between 10 and 12 years old, 13 boys and 7 girls, with whom we spent 2 hours of physical education following the classical curriculum. The research methods were the study of the specialized bibliography, the observation method with observation sheets of pupils' behavior, the graphic and mathematical methods. The results of the research showed significant differences between the two groups of pupils in the adaptation parameters to the school environment, the degree of integration in the school, the level of communication, the behavior at the lesson, and the work style; regarding the item of participation in group life, we found insignificant differences.

Key words: sports competitions, level of socialization, motor activities.

* * * * *

INTRODUCTION

Motor activities are considered the perfect framework for younger generations, being appreciated as a socializing factor with increasing importance in modern society. Both biological development and psychological traits shaped by the process of socialization contribute to continuous training as the summation and exercise of new social roles and the assimilation of new experiences.

* Sopa Ioan Sabin

The motor activities, whether organized, the physical education and sports lessons, or sports training, either free or competitive, have at this age a strong ludic character, aiming both at developing motor skills physical and social skills.

It is agreed that organized out of school activities can be substantial in many domains of children's development (Mahoney et al., 2005).

The theory of social learning has demonstrated that socialization best done in the sports environment. In the opinion of specialists, practicing physical activities or sports influences the personality of young people and creates positive effects on the body and mind. As stated by authors Gavriluță C. and Gavriluță N. (2005) "sport cultivates the spirit of the team and increases self-confidence. Undoubtedly, the greatest gain of socialization in sport is that it develops within us the idea of social affiliation and team spirit".

Scientists also concerned on other filed competencies that are influenced by sports activities as psychological or sociological stating that children that take part in out of school activities with sportive preponderant have low level of anxiety and depressed mood (Barber et al., 2001; Brustad et al., 2001; Larson, 1994; Mahoney et al., 2002).

Team sport is useful in educating many abilities in young children. The first of these skills is the competitive spirit. In today's society, we are surrounded all over the competition. Adults face competition when they apply or keep a job, while children face the competition when it comes to the results of school and sports. Participating in competitive teams sports from early ages can offer children the opportunity to understand the right aspects of competition in a friendly environment. It has discovered that students of all ages participating in team sports are better able to compete in other areas of their lives (Yan & McCullagh, 2004).

The involvement in sports activities rate has increased over the years and know researchers estimate that over 20 million children are involved in various sports activities (Kleiber & Powell, 2005) (Landers-Potts & Grant, 1999)

Child development experts say that young people are interested in team games and are part of a team around the age of 5-8 years (Nonis, 2005).

Understanding the processes by which children become involved and maintain their active concern for out of school sports activities is very important, and scientists need to examine closer this particularities (Borden et al., 2005).

Some scientists specialized in early education believe that if children learn the importance of cooperating with colleagues at a young age, they will be socially more prepared for kindergarten or school. (Nonis, 2005). It is important to help children understand, develop and appreciate the spirit of collaboration promoted by team sports. Socialization and individualization are essential and fundamental processes for human development (Sopa et al., 2014).

Pilaget (1981) - is a progressive process "there is a process of socialization that is progressive and not regressive, so that despite the appearances, the individuality of the 7-year-old and older, though tends toward autonomy, is more socialized than the little child's ego".

Sport is by excellence psychosocial, which includes multiple relationships between individuals with feelings, emotions, attitudes, behavior ultimately manifested in specific environment (partners, opponents, supporters, etc.) and the nonspecific linked to daily life, the game reflects social existence, of acquiring knowledge by motor and mental action, they reproduce social relations through written rules and unwritten, between cooperation and non-cooperation aimed at solving problems and overcoming them through action (Sopa & Pomohaci, 2016).

Sport and physical benefits

The physical benefits of participating in sports are the most relevant. Children often spend too much time in front of the TV or playing computer games. However, practicing team sports offers children the opportunity to practice and maintain their physical form and health. Team sports also help children preserve their physical well-being. Children who are actively involved in

sports can describe as being in good health toward those who do not participate in team sports. (Piko & Keresztes, 2006). There is little research into the risk of injury to young children participating in team sports. (Spinks & McClure, 2007). Also, young people with a strong constitution are more likely to be aware of healthy nutrition and choosing healthy foods than children who are not actively involved in sports (Pyle et al., 2003).

The social benefits of sport

While the importance of the health benefits of sport is undeniable, welfare benefits may be what attracts children to the sport. Given that they can spend more time with friends outside the school, it is more important to the child than being physically active. Skills useful to life through social interaction in sports activities can be extraordinary (Harrison & Naraya, 2003). Through social interaction in team sports, young people learn: collaborating with colleagues, resolving conflicts and communicating effectively with their colleagues.

Sports specialists say that motor activities are a valuable resource, unused, in building the human personality and diminish the negative influences of today's sedentary lifestyles. So, if at the beginning of the nineteenth century motor activities served limited purposes, being more used for recreation or as a recreation method after intense intellectual activities, in order to maintain their health, today these activities, through its various forms of practice, is one of the main means of achieving the ideal of education (Sopa & Pomohaci, 2017).

An essential focus given to building a team, some skills are needed in succeeding in the construction of a team such as working and accepting the others, accepting other viewpoints, accepting and allowing others space to be whom they are, recognizing and accepting individual differences, and working together toward a common goal (Larson et al., 2005). Sports can provide opportunities to develop problem-solving, communication, and leadership skills (Murnane, 2004; Weiss et al., 2005).

Time has validated the benefits of physical and motor activities on many skills like confidence in self, the level of self-esteem, level of anxiety, mood, and level of energy, reduced level of depression, tension and stress (Turcu & Todor, 2010).

Physical benefits of sport are well known and very important, but the social part attracts children in practicing a sport. They are happy that they can meet their friends and spend time with them outside of school, and this is more important than knowing they are physically active (Sopa & Pomohaci, 2015).

Rodriguez, Wigfield, and Eccles (2002) analyzed changes in children's sport competence beliefs, the perceived value of athletics, and self-esteem. Children learned that they were not as competent in athletics as they once believed, perhaps contributing to a decline in the value of athletics in general (Rodriguez et al., 2002). There were mixed findings regarding the hypothesis that participation would increase self-esteem; there was a general increase in years 1 and 2, but none between any other years (Epps, 2016).

Another study (Sopa & Pomohaci, 2014a) highlights the importance of sports competition in students' faculty's programs. Concluding that this kind of activities unites children and develops intragroup relationships, communication level and helps in socialization with other colleagues, and building strong and long lasting friendships. On the other hand students like this kind of activities because it improves health parameters and also because they like to play team sports with their close friends and to fight against them in a volleyball game. Also, other findings of the same scientists (Sopa & Pomohaci, 2014b) affective relationships observed in this sports groups go on the idea that students with better volleyball skills are preferred among the group and elected as leaders of the group that will require them to take decisions.

Some other findings in scientific research papers show that higher performances are obtained by those who participate more frequently in sports activities or art lessons compared with those kids that are not involved at all; or that children who are part of some clubs or youth sports

groups performed better at school compared with those that are involved in lower levels and also compared with the kids that activate in sports at a high level were rated as exhibiting fewer problem behaviors by their teachers (Simpkins et al., 2005; Fredricks et al., 2002).

In the present study, we concerned with surprising of some aspects and phenomena that characterize the social groups of the students' teams in different moments of activity: sports competitions, physical education lessons, sports activities, extra-curricular activities, sports training, etc. The observation, combined with various discussions with these groups of students, has helped us to obtain information about the affective relationships existing in these groups of students, the communication among students, the decision-making in the group, the resolution of the various conflicts concerning the group, the degree of socialization.

The problem of roles in the group is a highly significant research in the social sciences, but also extremely useful in analyzing current educational teams. In the teaching practice, is observed not only a combination that leads to a simple and practical approach to the phenomenon (Sopa & Pomohaci, 2016).

During the observation that coincided with the competition period, we noticed that the students developed an emulation around these events, the motivation for sports activities, either physical education lessons, sports training or competition training, increased considerably, children being enthusiastic both to the opportunity to participate and to give as much as possible and for the chance to compete with other schools, to know and to "measure their strengths" within the limits of sportiness and fair play. At the same time, the opportunity to participate in competitions outside the school and on different arenas or sports grounds has raised interest and curiosity, many of them want to get out of the "school daily schedule" and to get acquainted with new students, to relate, communicate and socialize with them.

PURPOSE

The aim of our study was to highlight the factors that influence socialization and the impact of extra-curricular activities and sports competitions on the social integration of students.

OBJECTIVES

The main purpose of the present study is to highlight the importance of motor activities, especially sports competitions, in student socialization, the development of combative but also fair play, group interrelation, communication, and assistance, especially the development of the idea of social affiliation and team spirit. The main objective of the experiment was to know the different aspects of the interaction process of the groups studied using the psycho-pedagogical observation sheets and knowing the formative-educational values of the motor activities.

HYPOTHESES

Starting from the observation that groups of students participating in sports competitions, motor activities and sports events where students meet, compete within the limits of fair play, tell their experiences, there is the possibility of developing new friendships, socializing, learning group notions, group membership and team spirit development, sports activity is more effective, our research aims to study these social relationships that sports competitions develop.

MATERIALS AND METHODS

In the present study, we used as research methods the scientific documentation through the study of the specialized literature, the method of observation with observation sheets of the behavior of the pupils at the physical education and sports training.

In the initial analysis of the two research groups, the experiment group, and the control group, we used the observation method, which is one of the most commonly used methods of

psycho-social studies, relatively easy to organize and apply, can be quickly adapted and utilized in the most diverse situations in the analysis of group evolution, and can be used in various ways, regarding the objective of research or on the nature of the group. Through this method, we have tracked and recorded behavioral manifestations of pupils in different social, individual or psycho-social situations, and we have analyzed the psychological particularities of the whole group or a particular individual.

We used observation sheets for observation of the two groups, elaborated for pupil psycho-pedagogic analysis, both in the experimental group and in the control group. The purpose of using these observation sheets was to track the reactions and feedback generated by the use of training programs in the experiment group, analyzing student behavior and the relationships created by the demands of the motor activities.

In the present study we were concerned with the surprise of some aspects and social phenomena of the two groups at competitive activities.

The observation, combined with various discussions with these groups of students, has helped us to obtain information about the affective relationships existing within the two groups, student communication, group decision-making, solving the various conflicts concerning the group, the relationship between formal leaders and informal and class group.

THE SAMPLE OF THE RESEARCH

The sample of the research consisted of two groups as we can see in Table 1: the first group was the experimental group, consisting of 20 pupils with the aged between 10 and 12, 12 boys and 8 girls; and the second group, the control group, composed of 20 pupils aged between 10 and 12, 13 males and 7 females. Within the experimental group, we started with basketball game initiation; students were doing 2 hours of physical education per week, we added 3 basketball training sessions and participating in two school competitions. The control group followed the structure of the classical physical education and sports curriculum.

Table 1. The distribution of the samples on gender and work program

Group of students	The age of the students	Gender		The program with which we worked
		Male	Female	
Experiment group	10 ± 2.4 years	12	8	2 hours of physical education and sports +3 training initiation in basketball
Control group	10 ± 2.1 years	13	7	Classical: 2 hours of physical education and sports respecting the classical school curriculum

RESULTS

The main objective of the experiment was to know the different aspects of the interaction process of the groups studied using the psycho-pedagogical observation sheets and knowing the formative-educational values of the motor activities with effects on the pupils.

During the observation we had several goals:

- observing the behavior and reactions of students in the experiment group following the implementation of training programs;
- tracking and analyzing the relationships created by the motor activities and their effects on behavioral features such as helping, cooperating, communicating and social inclusion;
- analyzing the students' harmonious physical development, forming skills specific to motor activities;
- analyzing the formative-educational values developed following the implementation of training programs that include, as a matter of priority, playful motor systems.

In the physical education and sports lessons conducted with the experimental group in which we have applied training programs that include, as a matter of priority, playful and agonistic motor systems, using dynamic games and team conquests to meet the objectives and themes of the lesson either aiming at developing motor skills or of the motor skills, we followed the feedback provided by the pupils, their reactions from the point of view of many characteristics as we can see in Table 2:

Table 2. Characteristics tracked by experimental group and control group by observation method

A. Adaptability level in the school environment	- inadaptatable, insufficiently adaptable, adaptable, easily adaptable, very easily adaptable
B. Degree of integration into the collective	- rejected by the collective, unintegrated in the collective, almost integrated into the collective, easily incorporated into the collective, incorporated into the collective
C. Level of communication	- isolated, self-contained, little communicative, detached, communicative
D. Behavior at lesson	- passive and unimpressed, waiting to be asked to get involved, conscious and active participation, active and cooperative, involved and willing
E. Work style	- commodious or lazy, uneven in leaps, inconsistent, diligent, systematic and organized
F. Participating in group life	- more withdrawn, isolated, less communicative; participates in the group's activity only if requested, accepts the group but prefers executive tasks, actively seeks contact with the panel, sociable, communicative, come with ideas; actively communicating, good organizer and group animator

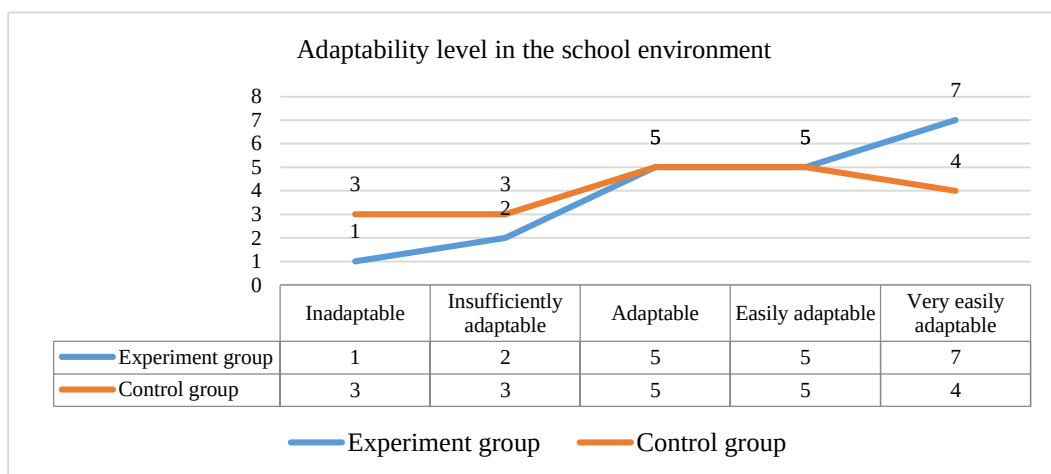


Figure 1. Item No. 1 - Adaptability degree in the school environment

As far as the adaptation to the school environment indicator is concerned, we can see in Figure 1 that within the experiment group pupils have a better adaptation compared to the pupils within the control group, so we can see that in the experiment group only one pupil remains inadaptatable in the school environment (representing 5% of the total number of pupils) compared to the control group where we encounter 3 such cases (representing 15% of the total number of pupils). Insufficient students adapted to the school environment were 2 in the experiment group

(representing 10% of the total number of pupils) compared to the control group where we meet 3 such cases (representing 15% of the total number of pupils).

For students adaptable to the school environment, we find an equal number of cases for both the experimental group and at the control group we observe 5 pupils (representing 25% of the total number of both groups). Easily adaptable students in the experimental group were 5 (representing 25% of the total number of students) compared to the control group where we encounter a total of 5 such cases (representing 25% of the total number of pupils).

The number of highly adaptable pupils in the experimental group was 7 (representing 35% of the total number of students) compared to 4 pupils in the control group (representing 20% of the total number of pupils).

Thus, we can see that the total number of pupils adapted to the school environment is higher in the experimental group compared to the control group (17 pupils tailored to the experimental group compared to 16 pupils suited to the control group).

Applying the T significance test, we noticed that the value of t was 4.8189 and p of 0.0001, $p < 0.05$, indicating a significant difference between the two groups.

P value and statistical significance: The two-tailed P value equals 0.0001. By conventional criteria, this difference is considered to be statistically significant. Confidence interval: The mean of Group One minus Group Two equals 0.55. 95% confidence interval of this difference: From 0.31 to 0.79. Intermediate values used in calculations: $t = 4.8189$, $df = 19$, standard error of difference = 0.114

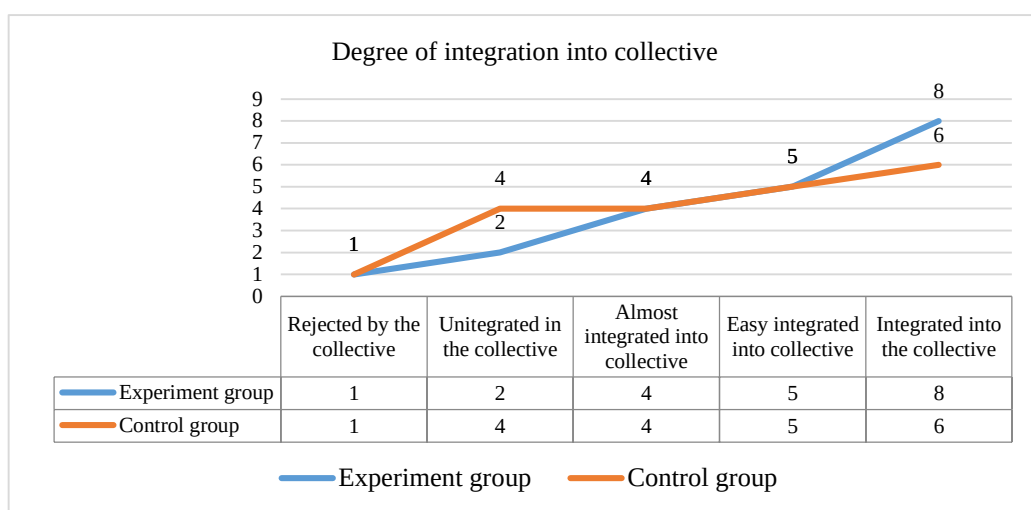


Figure 2. Item No. 2 - Degree of integration into collective

In the case of item "the level of integration in the group", we observe in Figure 2 that within the experiment group pupils have a higher degree of integration in collective compared to the students from the control group, so we can see that in the experimental group and also in the control group just one pupil is rejected by the collective (representing 5% of the total number of pupils). The non-integrated students were 2 in the experiment group (representing 10% of the total number of pupils) compared to the control group where we encounter 4 such cases (representing 20% of the total number of pupils).

In the case of almost integrated students, we find an equal number of cases for both the experimental group and the control group. We observe 4 students (representing 20% of the total

number of both groups). Easily integrated students within the experiment group were 5, the same to the control group (representing 25% of the total number of students).

The number of integrated pupils in the experimental group was 8 (representing 40% of the total number of students) compared to 6 pupils in the control group (representing 30% of the total number of pupils).

Thus, we can see that the total number of pupils integrated into the panel is higher in the experimental group compared to the control group (13 pupils incorporated into the experimental group compared to 11 pupils integrated into the control group).

Applying the T significance test, we noticed that the value of t was 2.8536 and p of 0.0102, $p < 0.05$, indicating a significant difference between the two groups.

P value and statistical significance: The two-tailed P value equals 0.0102. By conventional criteria, this difference is considered to be statistically significant. Confidence interval: The mean of Group One minus Group Two equals 0.30; 95% confidence interval of this difference: From 0.08 to 0.52. Intermediate values used in calculations: $t = 2.8536$ $df = 19$ standard error of difference = 0.105

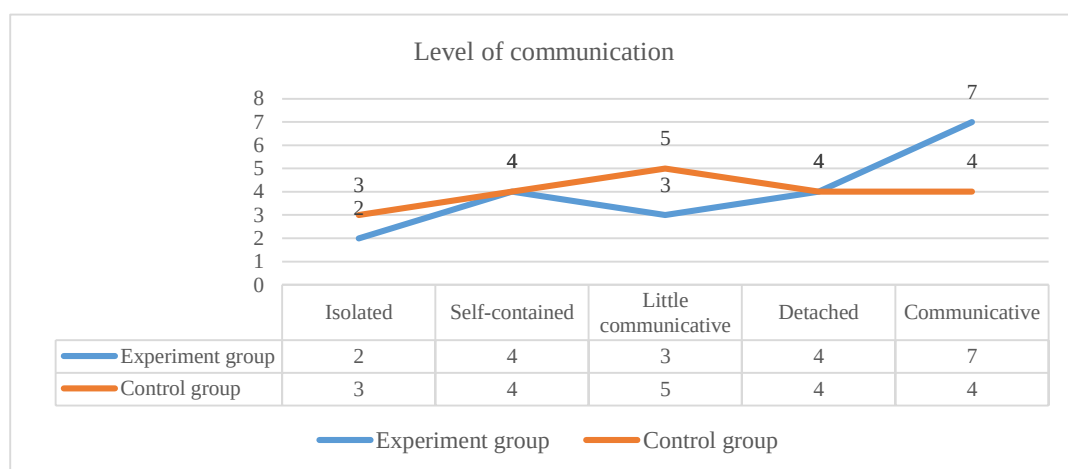


Figure 3. Item No. 3 - Level of communication

At the communication level indicator, we observe in Figure 3 that within the experiment group pupils have a better communication level than the students in the control group, so we can see that only 2 students are rejected by the collective in the experiment group (representing 10% of the total number of pupils) compared to the control group where we meet 3 such pupils (representing 15% of the total number of pupils). In the case of self-contained students, we find an equal number of cases, both for the experimental group and for the control group, we observe 4 pupils (representing 20% of the total number of both groups).

The less communicative students were 3 in the experiment group (representing 15% of the total number of students) compared to the control group in which we find 5 pupils (representing 25% of the total number of pupils).

In the case of detached students in the experiment group, they were 4 in the same way as for the control group (representing 20% of the total number of pupils).

The number of students communicative in the experimental group was 7 (representing 35% of the total number of pupils) compared to 4 pupils in the control group (representing 20% of the total number of pupils).

Therefore we find that the total number of students with an increased level of communication is higher in the experimental group compared to the control group (11 students with an excellent degree of disclosure in the experimental group compared to 8 students in the control group). Applying the T significance test, we noticed that the value of t was 3.5590 and p of 0.0021, $p < 0.05$, indicating a significant difference between the two groups.

P value and statistical significance: The two-tailed P value equals 0.0021. By conventional criteria, this difference is considered to be statistically significant. Confidence interval: The mean of Group One minus Group Two equals 0.40; 95% confidence interval of this difference: From 0.16 to 0.64 Intermediate values used in calculations: $t = 3.5590$; $df = 19$; standard error of difference = 0.112

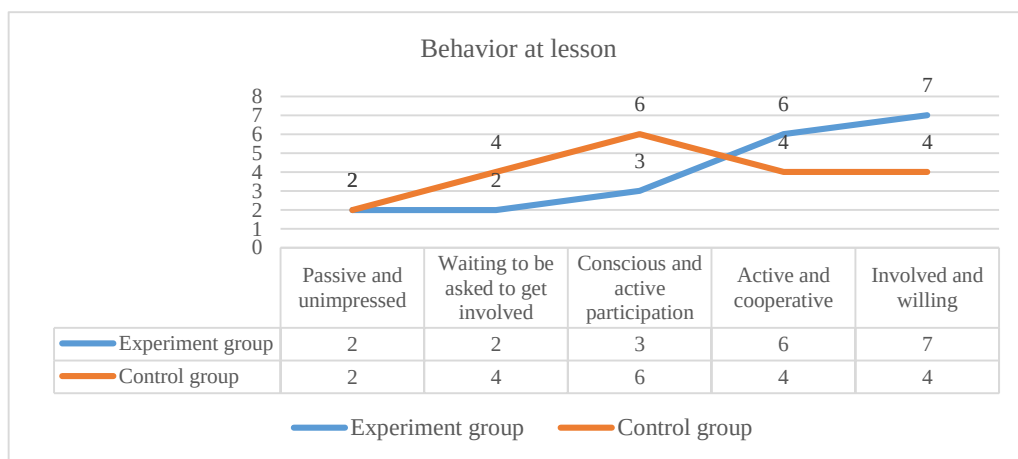


Figure 4. Item No. 4 - Behavior at lesson

In the case of the conduct at the lesson indicator we can see in Figure 4 that in the experiment group the pupils have a more active behavior compared to the students in the control group, so we can see that we have two passive and uninvolved pupils in both groups (representing 10% of the total number of students). Regarding the students waiting to be asked to get involved, we have 2 pupils (representing 10% of the total number of pupils) in the case of the experimental group compared to the control group where we have 4 such cases (representing 20% of the total number of pupils students).

Students who have a conscious and active participation in the lesson were 3 in the experiment group (representing 15% of the total number of students) compared to the control group in which we have 6 pupils (representing 30% of the total number of pupils).

For the active and cooperative students in the experimental group, there were 6 pupils (representing 30% of the total number of pupils) compared to only 4 pupils in the control group (representing 20% of the total number of pupils).

The number of pupils involved and willing in the experimental group was 7 (representing 35% of the total number of pupils) compared to only 4 pupils in the control group (representing 20% of the total number of pupils).

Thus, we can see that the total number of students with active behavior at the lesson is higher in the experimental group compared to the control group (13 pupils with an active behavior in the experimental group compared to 8 pupils in the control group).

Applying the T significance test we noticed that the value of t was 4.3589 and p of 0.0003, $p < 0.05$, indicating a significant difference between the two groups.

P value and statistical significance: The two-tailed P value equals 0.0003. By conventional criteria, this difference is considered to be statistically significant. Confidence interval: The mean of Group One minus Group Two equals 0.50; 95% confidence interval of this difference: From 0.26 to 0.74. Intermediate values used in calculations: $t = 4.3589$; $df = 19$, standard error of difference = 0.115

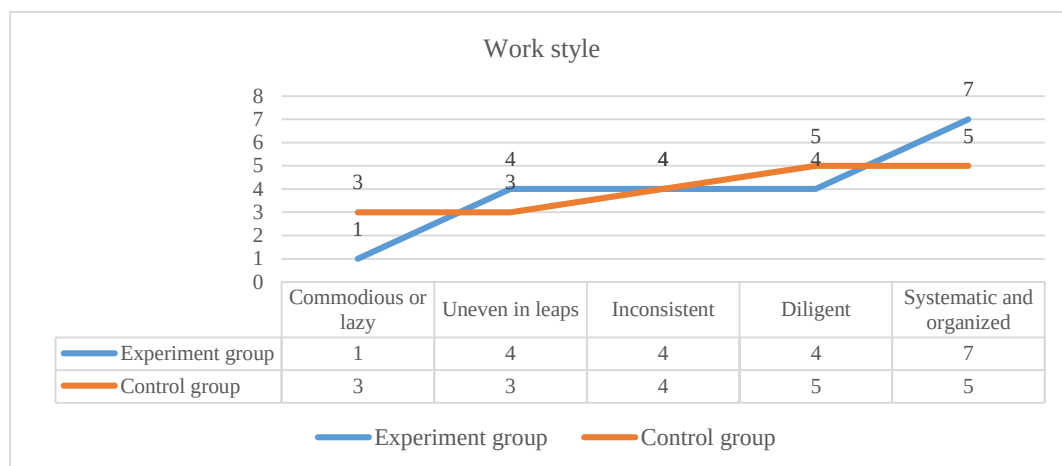


Figure 5. Item No. 5 - Work style

In the case of the indicator behavior at lesson we can see in Figure 5 that in the experiment group the pupils have a more active behavior compared to the students in the control group, so we can see that we have two passive and uninvolved pupils in both groups (representing 10% of the total number of students). Regarding the students waiting to be asked to get involved, we have 2 pupils (representing 10% of the total number of pupils) in the case of the experimental group compared to the control group where we have 4 such cases (representing 20% of the total number of pupils students).

Students who have a conscious and active participation in the lesson were 3 in the experiment group (representing 15% of the total number of students) compared to the control group in which we have 6 pupils (representing 30% of the total number of pupils).

For the active and cooperative students in the experimental group, there were 6 pupils (representing 30% of the total number of pupils) compared to only 4 pupils in the control group (representing 20% of the total number of pupils).

The number of pupils involved and willing in the experimental group was 7 (representing 35% of the total number of pupils) compared to only 4 pupils in the control group (representing 20% of the total number of pupils).

Thus, we can see that the total number of students with active behavior at the lesson is higher in the experimental group compared to the control group (13 pupils with an active behavior in the experimental group compared to 8 pupils in the control group).

Applying the T significance test we noticed that the value of t was 4.3589 and p of 0.0003, $p < 0.05$, indicating a significant difference between the two groups.

P value and statistical significance: The two-tailed P value equals 0.0102. By conventional criteria, this difference is considered to be statistically significant. Confidence interval: The mean of Group One minus Group Two equals 0.30; 95% confidence interval of this difference: From 0.08 to 0.52. Intermediate values used in calculations: $t = 2.8536$; $df = 19$, standard error of difference = 0.105

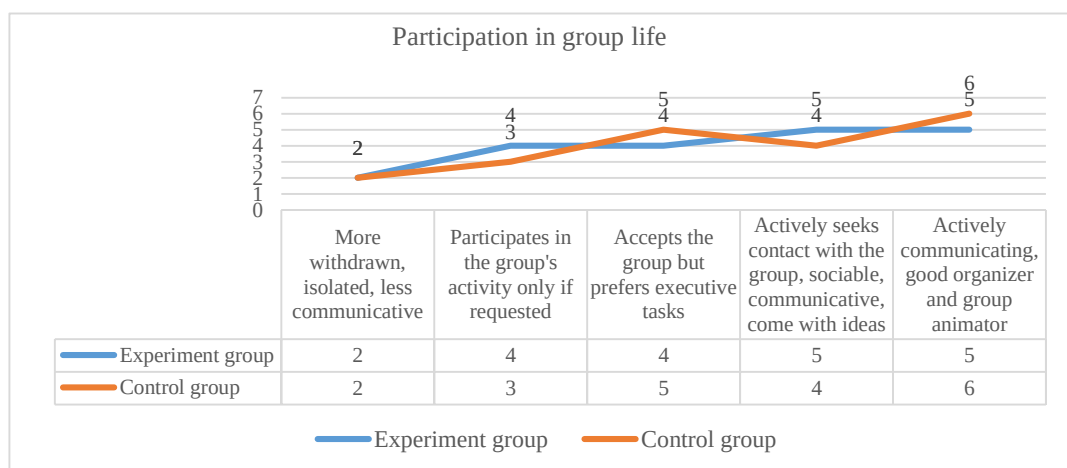


Figure 6. Item No. 6 - Participation in group life

At the indicator group participation, we observe in Figure 6 that in the experiment group pupils have a more active behavior compared to the students in the control group, so we can see that we have two pupils isolated and less communicative in both groups (representing 10 % of the total number of students). For students who participate in the group activity only if requested we have in the experiment group 4 pupils (representing 20% of the total number of pupils) compared to the control group where we record 3 such cases (representing 15% of the total number of pupils of students).

Students who accept the group but prefer administrative tasks were 4 in the experiment group (representing 20% of the total number of students) compared to the control group in which 5 pupils (representing 25% of the total number of pupils) found.

In the case of students seeking actual contact with the panel, sociable, communicative, come with ideas we have within the experiment group 5 students (representing 25% of the total number of pupils) compared to only 4 pupils in the control group (representing 20% of the total).

The number of active, communicating, good organizers and animators of the panel in the experiment group we have 5 examples (representing 25% of the total number of students) compared to 6 pupils in the control group (representing 30% of the total number of pupils).

Thus, we find that the total number of students with active behavior in the lesson is equal in both groups (10 students in the experimental group and 10 students in the control group).

Applying the T significance test we noticed that the value of t was 1.4530 and p of 0.1625, $p > 0.05$, indicating an insignificant difference between the two groups.

P value and statistical significance: The two-tailed P value equals 0.1625. By conventional criteria, this difference is considered to be not statistically significant. Confidence interval: The mean of Group One minus Group Two equals -0.10; 95% confidence interval of this difference: From -0.24 to 0.04. Intermediate values used in calculations: $t = 1.4530$; $df = 19$, standard error of difference = 0.069

CONCLUSIONS

From analyzing the observation sheets at the physical education lessons and extra-curricular activities, we were able to observe the following:

The level of conscious and active involvement of students in proposed motor activities has increased in the experimental group. If at the beginning of the activity the students were more

reticent in the hours involved, during the lessons, the willingness to participate and their level of involvement increased considerably.

From the point of view of the temperament of the experimental group it was possible to notice, from the psycho-pedagogical observation sheets, a certain restraint at the beginning of the activity with the pupils, some of them were very timid and isolated from the group, others emotive but willing to participate in the competitions and the proposed activities, very few bold and detached, showing leadership and leading the group. During the program of the motor activities, the students in the experiment group managed to change their attitude and not be retained and inhibited, developing relationships of collaboration and friendship.

Regarding the communication level at the experiment group, we have seen at the beginning some minor misunderstandings, conflicts between students, disagreement on the organization of groups, they had no leaders of the team which led to weaker results regarding efficiency. We have managed to adjust these little misunderstandings and improve communication among students, to find group leaders

Concerning the competitive activity, we noticed that the students developed an emulation around these events, the motivation for sports activities or the physical education lesson, extra-curricular activities or training for the contest increased considerably, the children being enthusiastic about both the possibility of participation and the premiere, but especially the opportunity to compete with other schools, to know and to "measure forces" within the limits of sportiness and fair play. At the same time, the opportunity to participate in competitions outside the school and on different arenas or sports grounds has raised interest and curiosity, many of them wanting to get out of the "daily school schedule" and to get acquainted with new students, to relate, to communicate and to socialize with these.

Sport, whether in team or individual, is a tremendous activity for children, offering a variety of benefits in addition to physical activity. Participating in sporting activities can contribute to self-image and self-confidence, can motivate the child to excel academically and develop social skills.

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FENCING TRAINING EFFECT ON MUSCULOSKELETAL FITNESS IN CHILDREN DIAGNOSED WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER

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Abstract: The present research intends to examine the effect of a fencing training program on Musculoskeletal fitness of youth population diagnosed with Attention Deficit Hyperactivity Disorder. *Musculoskeletal fitness* (Mf) is a multidimensional design comprising the integrated function of muscle strength, muscle endurance, and flexibility constructed to enable the performance of work against one's own body weight or external resistance. One of the suggested tests for Mf evaluation is the Eurofit Test Battery. The study population (N=40) children, mean age of 10 at the beginning of the study diagnosed with ADHD divided into two groups: one is the experimental fencing training group (N=20, 10 boys and 10 girls) applying fencing training program combined with general physical activity program and specifically fencing physical activity program; compared to the second group, the Physical Activity (PA) control group (N=20, 10 boys and 10 girls) about the same age and characteristics undergoing only a Physical Education (PE) training program. The duration of the research was 9 months, twice a week, 90 minute each time. The end results as reflected from the Eurofit Physical Fitness Test Battery indicate superiority of the fencing program over the PA program. The control group undergoing PA program achieved definitive higher results only for the Flamingo Balance test and for the muscular upper body development as reflected by the Arm Bent while all other test where in favor of Fencing Training program. Fencing Training program was found to yield higher impact on Physical Fitness than the control group undergoing PA training program as reflected from the Eurofit Physical Fitness Test Battery, supporting the presumption of Fencing Training program superiority on improving the Mf of ADHD diagnosed children over plain PA program.

Key words: Musculoskeletal fitness, Eurofit Test Battery, ADHD, fencing, physical education

* * * * *

INTRODUCTION

This study shows the effect of a fencing training program and PA program on Musculoskeletal of youth Attention Deficit Hyperactivity Disorder (ADHD) diagnosed population as reflected by Eurofit Test Battery results.

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Musculoskeletal fitness (Mf) is a multidimensional design comprising the integrated function of muscle endurance, muscle strength, and flexibility constructed to enable the performance of work against the own body weight and or an external resistance. *Muscle strength* is the ability of the skeletal muscle to exert great force, stress, pressure twisting force, moment of joints during a single or few maximal voluntary contractions, performed within a defined set of controlled conditions, including specificity of movement pattern like muscle tension type (concentric, isometric, or eccentric), and contraction speed. *Muscle endurance* as defined by Kell et al., (2001) is "*the ability of a muscle or muscle group to perform repeated contractions against resistance an extended period of time*".

The physical fitness can be either an absolute external resistance, which provides measure of absolute endurance, or a relative effort based on an individual's maximal strength, which provides measure of relative endurance. Flexibility has two components; dynamic and static, static - the range of motion of a joint, dynamic – the resistance of a joint to movement namely the forces opposing movement rather the range itself.

Over the past 55 years the fitness test batteries have been used to assess Mf in youth – Artero E.G. et al., (2011) reviewed 32 relevant studies between 1990 to 2009, Ruiz R. J. et al. (2011) suggested the ALPHA Test Battery, and a more recent and comprehensive work by Ortega F.B. et al. (2014) came up with the proposal of the Pre-fit Battery. The tests vary in their specific protocols; some intend to assess the muscle fitness of specific body regions like skeleton, lower back, abdomen and some measuring isolated muscular function like muscle strength, endurance, and power and or combined strength and endurance function.

At 1988 the Council of Europe has devised the Eurofit Physical Fitness Test Battery for children of school age. It includes nine physical fitness tests covering flexibility, speed, endurance and strength. The tests designed so that they can be performed within 35 to 40 minutes and can use very simple measurement equipment. According to Skowronsky W. et al. (2009) the Eurofit Special was able to distinguish performance levels by gender, age and level of intellectual disability and Polish researchers confirmed that individuals with intellectual disabilities had significantly lower levels of physical and motor functioning than individuals without intellectual disabilities, while the classification of intellectual disability is based on IQ level.

Diagnostic and Statistical Manual of Mental Disorders (DSM 5) most widely used in USA determined that "*ADHD is a neurodevelopmental disorder defined by impairing levels of inattention, disorganization, and/or hyperactivity-impulsivity*". The term used by the International Classification of Mental and Behavioral Disorders 10th revision (ICD10) widely used in Europe is hyper-kinetic disorder (HKD) and population surveys, affirmed that ADHD occurs in most cultures in about 5% of children and about 2.5% of adults, being about 3 times more common in boys than in girls.

The impact of PA on ADHD was investigated very deeply during the last years from various aspects – Verret (2012) concluded that functional adaptation of children with ADHD may be clinical relevant with structured PA program; Matthew B. P. (2013) concluded that positive implications on children with ADHD may be caused by single bouts of 20 minutes mildly aerobic exercise; Hoza (2015) found reduced impairment associated with ADHD following PA intervention; Wigal (2012) and Smith (2013) aimed to help manage symptoms of ADHD by advance habitual PA through organized sports; Egmond-Frohlich (2012), Berger (2014) reported on reducing the risk for ADHD symptoms through PA, similar to Gapin J. (2011); Kiluk (2009) concluded that practicing PA promote emotional functioning. Fencing is a combat type PA utilizing skills advantageous to a warrior such as speed, strength, accuracy and courage. Fencing was found to improve physical conditioning, and emotional balance Johnson R. C. (2000).

This article is based on the results of Eurofit Physical Fitness Test Battery conducted as part of thesis research regarding "The influence of a fencing training program on youth population diagnosed with ADHD" which made use of the Test Battery as a tool to evaluate the subject's Physical Fitness before and after the intervention program.

OBJECTIVES

The objectives of this study were to determine the effects of fencing training program on musculoskeletal fitness of children diagnosed with ADHD, compared with the effect of physical activity in physical education lessons.

MATERIALS AND METHODS

The research subjects were 40 elementary 4th grade students divided into two groups: 20 Fencing Training Group (FTG) – 10 girls and 10 boys) and 20 Control Physical Activity Group (CPAG) – 10 girls and 10 boys – all diagnosed as ADHD. After the preliminary tests we found no differences between the groups, confirming that the groups are homogeneous. The research period was thru whole academic year (9 months). All research population was divided randomly and had no previous expertise in fencing, similar to research conducted by Kang K.D (2011) with 13 diagnosed ADHD children undergoing sport activity compared to a control group of 15 diagnosed ADHD children, performing education on behavior control sessions during a 6-week, 90-min twice a week. The intervention program consisted of fencing training program or physical education lessons of 90 minutes, twice a week.

The Fencing group undergoing fencing training program comprised three steps annual program:

- Step A – November 2014 – January 2015; basic fencing skills and improvement of physical condition like on-guard, back and forth movement, crouch, basic attacks and composite attacks involving balestra and forward leap.
- Step B – February 2015 – May 2015; tactical fencing skills and improvement of particular fencing physical condition like enhanced attack combinations, enhanced defense combinations, enhanced fencing dexterity – double, parry, coupe, flash
- Step C – June 2015 – October 2015; competitive fencing skills like competitive training including 4 hit and 8 hit matches, internal club competitions with and without rewards, regional competitions.

The control group received physical education lessons by the same amount of time and sessions as the study group but emphasized on general physical fitness.

The study was performed after-school activity program with population chosen among Misgav elementary school and fencing clubs in Akko city and Kiryat Ata city and Maalot city.

First step in the study was to conclude the research population among school children. For statistical homogeneity all children were ADHD diagnosed using the familiar social performance evaluation test ADHD RS (Rating Scale) IV: Home Version questionnaire – as explored by Goodman D. (2010).

The Eurofit Test Battery was applied for both fencing and control groups at the early first stage of the research and once again at the termination according the rules implied by the test. The Eurofit Physical Fitness Test Battery is a set of nine physical fitness tests covering speed, flexibility, endurance and strength. The standardized test battery was devised by the Council of Europe, for children of school age and has been used in many European schools since 1988. The series of tests are designed so that they can be performed within 35 to 40 minutes, using very simple equipment

The data obtained were statistically analyzed using the SPSS program, by performing the descriptive analysis and comparing the means.

RESULTS

As standard procedure, the Eurofit Test Battery includes also anthropometric measurements of height, weight, BMI and % body fat from skinfold thickness. After the measurement was carried out descriptive analysis thereof, resulting from this point of view the two groups are homogeneous (Table 1).

Table 1. The mean and standard deviations values of anthropometric measurements (N=40)

Group	Age		Weight		Height		BMI	
	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV
FTG (N=20)	9,60	±0,35	35,62	±6,10	1,4	±0,1	18,05	±
CPAG (N=20)	9,64	±0,75	34,50	±4,30	1,4	±0,3	16,45	±

Before applying the intervention program in the two groups, preliminary testing of physical fitness of subjects with Eurofit Tests Battery was performed. The results were interpreted statistically, the descriptive analysis to these data is shown in Table 2.

Table 2. The assessment of subjects (N = 40) using the Eurofit Test Battery

Test	Group	Group Statistics			
		N	Mean	Std. Deviation	Std. Error Mean
Flamingo	Fencing group	20	9,75	8,24	1,84
	CG Physical Activity	20	8,45	7,98	1,79
Plate Tapping	Fencing group	20	13,20	1,83	0,41
	CG Physical Activity	20	13,58	1,61	0,36
Sit and Reach	Fencing group	20	0,25	2,02	0,45
	CG Physical Activity	20	-1,45	3,93	0,88
Standing Broad Jump 1	Fencing group	20	1,33	0,16	0,04
	CG Physical Activity	20	1,30	0,19	0,04
Standing Broad Jump 2	Fencing group	20	1,37	0,15	0,03
	CG Physical Activity	20	1,37	0,24	0,05
HGTL	Fencing group	20	13,90	3,09	0,69
	CG Physical Activity	20	13,90	2,90	0,65
HGTR	Fencing group	20	14,44	3,32	0,74
	CG Physical Activity	20	14,26	2,51	0,56
Sit-Up	Fencing group	20	21,45	4,50	1,01
	CG Physical Activity	20	20,65	4,30	0,96
Bent Arm Hang	Fencing group	20	11,50	11,58	2,59
	CG Physical Activity	20	5,91	7,03	1,57
Shuttle Run	Fencing group	20	23,52	2,80	0,63
	CG Physical Activity	20	21,56	5,41	1,21
Endurance	Fencing group	20	3,36	1,58	0,35
	CG Physical Activity	20	3,43	1,68	0,38

After the preliminary tests we found no differences between the groups, confirming that the groups are homogeneous

Table 3. Testing the distribution of subjects' results to Eurofit tests

Tests	Tests of Normality			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Flamingo Balance	,296	40	,000	,732	40	,000
Plate Tapping	,079	40	,200*	,981	40	,714
Sit and Reach	,199	40	,000	,935	40	,023
Standing Broad Jump 1	,083	40	,200*	,968	40	,316
Standing Broad Jump 2	,138	40	,054	,955	40	,115
Hand Grip Left	,092	40	,200*	,980	40	,704
Hand Grip Right	,121	40	,146	,957	40	,131
Sit-Up	,148	40	,028	,945	40	,050
Bent Arm Hang	,195	40	,001	,805	40	,000
Shuttle Run	,206	40	,000	,674	40	,000
Endurance	,137	40	,056	,919	40	,007

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

As shown in Table 3, the distribution test shows that Flamingo, Sit and Reach, Sit-up, Bent Arm and Shuttle Run results are normally distributed, meaning that for testing the significance of differences in the mean scores of the subjects in the two groups we will use a parametric test, that is, Independent Sample t-Test. In Table 4 we can see that in any of these tests the difference between the means of the two groups is not significant, it can be said that they are equal in terms of statistics.

Table 4. Independent Sample t-Test for Flamingo, Sit and Reach, Sit-up, Bent Arm and Shuttle Run tests

Tests		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Flamingo Balance	Equal variances assumed	,114	,738	,507	38	,615
Sit and Reach	Equal variances not assumed	7,208	,011	1,721	28,42	,096
Sit-Up	Equal variances assumed	,183	,671	,575	38	,569
Bent Arm	Equal variances not assumed	13,046	,001	1,844	31,32	,075
Shuttle Run	Equal variances assumed	,232	,633	1,438	38	,158

Because the results of Plate Taping, Standing Broad Jump, Left Hand Grip, Hand Grip Right and Endurance tests are not normally distributed, were compared the means using the nonparametric Mann-Whitney U test. No significant differences were found (Table 5).

Table 5. Nonparametric tests for Plate Taping, Standing Broad Jump, Left Hand Grip, Hand Grip Right and Endurance

Test Statistics ^a				
	Mann-Whitney U	Wilcoxon W	Z	Sig. (2-tailed)
Plate Taping	155,00	365,00	-1,218	,223
Standing Broad Jump	188,50	398,50	-,311	,755

Fencing training effect on musculoskeletal fitness in children diagnosed with ADHD

Hand Grip Left	183,50	393,50	-,447	,655
Hand Grip Right	186,00	396,00	-,379	,705
Endurance	197,00	407,00	-,081	,935

a. Grouping Variable: Group

After carrying out of the intervention programs (1 academic year) were repeated Eurofit Tests Battery, mean and standard deviation of the measurements are shown in Table 6.

Table 6. Descriptive statistics of final measurements (N=40)

	N	Minimum	Maximum	Mean	Std. Deviation
Flamingo Balance Test 2	40	11,00	26,00	16,65	4,14
Plate Tapping 2	40	9,22	15,45	12,25	1,79
Sit and Reach 2	40	-9,00	25,00	1,54	5,72
Standing Broad Jump 21	40	1,15	1,98	1,56	0,20
Standing Broad Jump 22	40	1,38	2,20	1,63	0,21
Hand Grip Left 2	40	10,10	24,80	17,10	3,57
Hand Grip Right 2	40	10,20	25,10	17,49	3,12
Sit-up 2	40	15,00	30,00	24,08	4,28
Bent Arm Hang 2	40	,98	36,01	12,34	10,35
Shuttle Run 2	40	17,08	26,38	21,32	2,10
Endurance 2	40	2,03	6,57	3,95	1,55

In order to see the effect of the intervention programs on the physical fitness of the subjects, we need to check whether there are differences between the means of the measurements made at the beginning and at the end of the interventions program and, if they exist, to test whether they are significant or not. For this, we need to compare the means using the appropriate tests. In our case the t-test for pairwise samples was used, and we can see in Table 7 that the differences are highly significant, with the exception of 5x10 Shuttle Run Test ($t = 1.68$, $df = 39$, p 2-tailed = 0.100).

Table 7. Paired Samples t-Test for Eurofit Tests Battery

	t	df	Sig. (2-tailed)
Pair 1 Flamingo Balance Test 1 - Flamingo Balance Test 2	-4,21	39	,000
Pair 2 Plate Tapping 1 - Plate Tapping 2	8,73	39	,000
Pair 3 Sit and Reach 1 - Sit and Reach 2	-3,36	39	,002
Pair 4 Standing Broad Jump 2 - Standing Broad Jump 22	-11,69	39	,000
Pair 5 Hand Grip Left 1 - Hand Grip Left 2	-15,30	39	,000
Pair 6 Hand Grip Right 1 - Hand Grip Right 2	-14,62	39	,000
Pair 7 Sit-up 1 - Sit-up 2	-7,57	39	,000
Pair 8 Bent Arm Hang 1 - Bent Arm Hang 2	-7,25	39	,000
Pair 9 Shuttle Run 1 - Shuttle Run 2	1,68	39	,100
Pair 10 Endurance 1 - Endurance 2	-11,75	39	,000

DISCUSSION

In the following we will analyze the results from the point of view of the effect of the intervention programs. For the analysis of the effect to be well reflected, measurement is made by comparing the amounts of each subject, depending on the group to which it belongs and the time the measurements were made (initial or final).

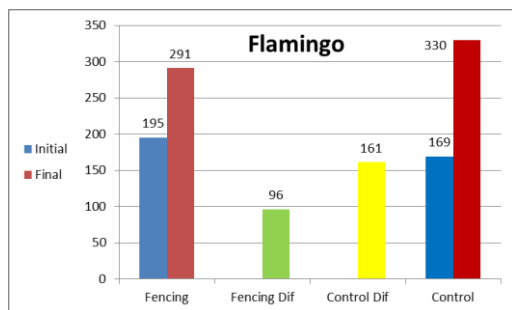


Figure 1. Training Effect: Flamingo Balance Test

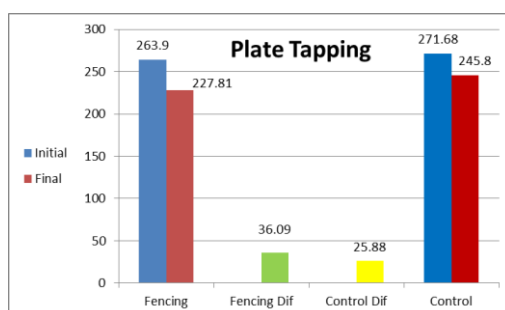


Figure 2. Training Effect: Plate Tapping Test

The score achieved by Flamingo Balance test trying to assess the ability to balance successfully on a single leg is displayed in Figure 3. This particular test is quite misleading since a null score can be achieved in two opposite ways: either by achieving the best score given for not falling at all, and remaining on the board for 60 seconds or by achieving the worst score given after falling from the board 15 times during the first 30 seconds. Therefore, the data of this test cannot be processed by a straightforward quantitative analysis.

Figure 2 shows the scores recorded on the Tapping Plate test. The initial scores are higher than the final scores indicating the time taken to complete 25 full cycles (50 taps) decreased, therefore the speed increased, (inverse correlation between data to value) following training and it is seen that fencing program (36.09) contributed to this dexterity more than the control group (25.88) – not surprisingly, because of the stabbing and defences using hand movements in fencing.

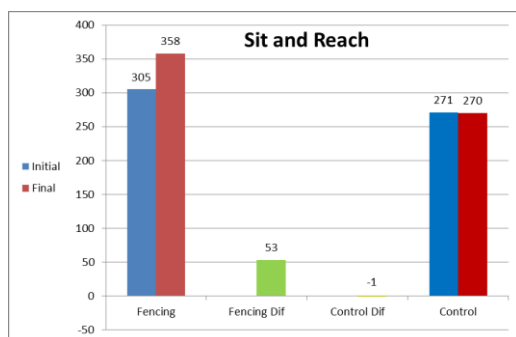


Figure 3. Training Effect: Sit and Reach Test

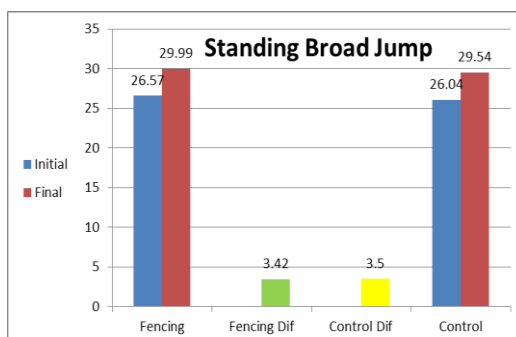


Figure 4. Training Effect: Standing Broad Jump Test

In the Sit and Reach test, the initial scores are lower than the final scores, meaning the flexibility translated into the ability to reach further distance increased (direct correlation) following training and it displays that fencing program (53) contributed to this dexterity more than the control group (-1) that actually caused a decrease (Figure 3). The contribution of fencing is of

no surprise, because of the lunge and Jumps used in fencing. The decrease of the control group is also explainable since flexibility is an ability that is lost with time if not worked hard.

Figure 4 shows the score achieved by Standing Broad Jump test. The initial scores are lower than the final scores, meaning the muscular leg power translated by the ability to reach further distance, increased (direct correlation) following training and it is seen that fencing program (3.42) contributed to this dexterity just a little less than the control group (3.5). The reason could be because fencing requires a diversity of capabilities that have to be implemented into a certain time limit and have to disperse the focal points.

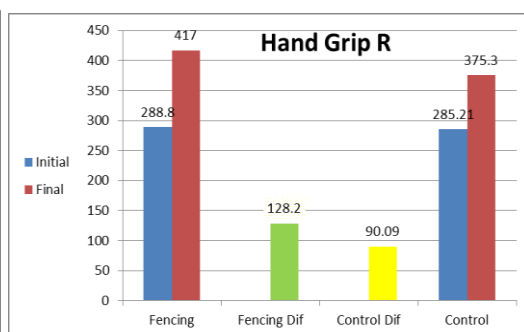
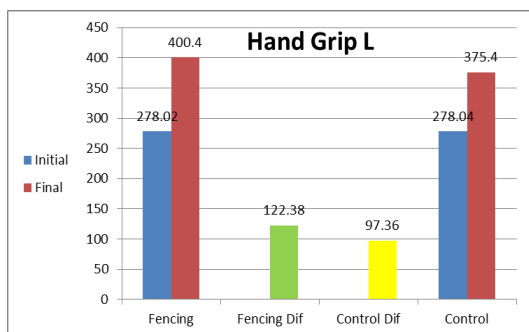


Figure 5. Training Effect: Hand Grip Left **Figure 6.** Training Effect: Hand Grip Right

Referring to Hand Grip Test for two hands (Figures 5 and 6), the analysis will be done separately for each hand. The initial scores for left hand (Figure 5) are lower than the final scores, meaning the muscular arm power translated into the ability to grip harder increased (direct correlation) following training, and it is seen that the fencing program (122.38) contributed to this dexterity more than the control group (97.36). The predominance of the fencing program effect is explained by the use of the hand to manipulate the sword.

The initial scores for the right hand are lower than the final scores (Figure 6), meaning the muscular arm power translated into the ability to grip harder increased (direct correlation) following training, and it is seen that the fencing program (128.2) contributed to this dexterity more than the control group (90.09). The superiority of the fencing program is explained by the manipulation of sword in the hand. It is also interesting to compare the relative progress of the left hand (25.02) to the relative progress of the right hand (38.11) and to assume there are more right handed than left handed fencers. It is also interesting to expose the results in light of the research done by Deforche B. (2003) who found that obese children achieve better strength on handgrip than non-obese children.

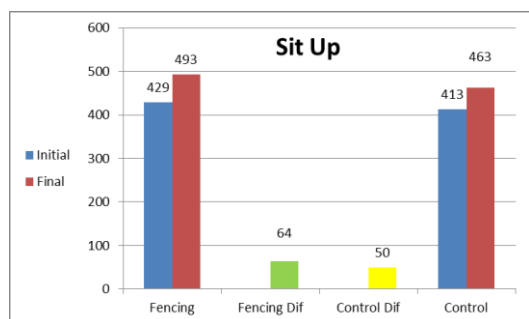


Figure 7. Training Effect: Sit-Up Test

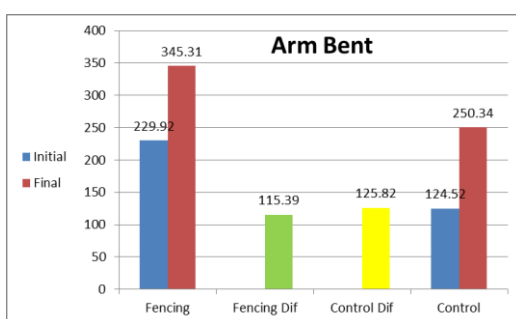


Figure 8. Training Effect: Arm Bent Test

Figure 7 is shown the score achieved by Sit Up test. The initial scores are lower than the final scores, meaning the muscular abdomen increased (direct correlation) following training and it is seen that fencing program (64) contributed to this skill more than the control group (50). The supremacy of the fencing program is explained by the body movements including leaning forward and backward used in fencing.

The initial scores for Arm Bent test (Figure 8) are lower than the final scores, meaning the muscular upper body increased (direct correlation) following training and it is seen that fencing program (115.39) contributed to this dexterity less than the control group (125.82). The inferiority of fencing is explained by the lack of needed and use of Isometric exercise in upper body power.

The score achieved by 10x5 Shuttle test we can see in Figure 9. The initial scores are higher than the final scores, meaning the agility translated into less time required for completing the 50 meters run increased (inverse correlation) following training, and it is seen that fencing program (40.87) contributed to this skill more than the control group (13.56). The result of the fencing program is explained by the needed of a sudden back and forth movements thru changing direction and speed required in fencing for the attacks, defends and retreats.

Figure 10 presents the score achieved by 20m Endurance test also known as the "Beep Test". The initial scores are lower than the final scores meaning the VO_{2max} (the ability to consume more oxygen in less time) increased (direct correlation) following training and it is seen that fencing program (100.9) contributed to this ability much more than the control group (31.75). The superiority of the fencing program is explained by the intensity of the activity required in fencing to constantly keep up with the opponent from the other side and with the necessity of fighting many combats during a training lesson.

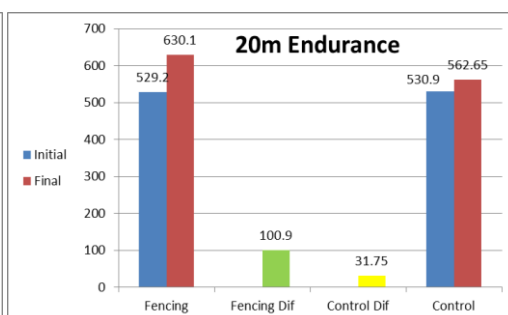
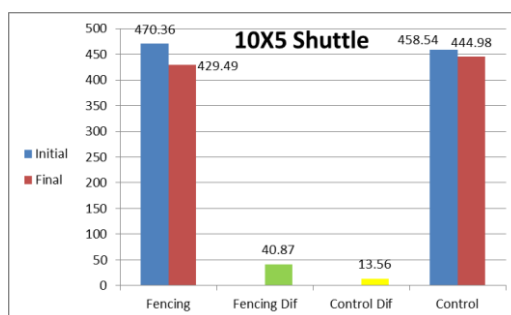


Figure 9. Training Effect: 10x5 Shuttle Test

Figure 10. Training Effect: 20m Endurance Test

Figure 11 indicates the fencing training effect comparative to the control group effect. The outcome is stand alone for each test the tests can-not be compared one to other because the different scale used for each test. The visualization provides an overall knowledge about the quality of the data: all values above the null line indicate superiority of the fencing program over the PA program. There are only three tests upon which the values are under the null line indicating inferiority of the fencing training program over the PA program:

- Flamingo Balance test- As explained earlier can-not be quantitatively analyzed because the scoring system by giving the null score both to the best and worst performances therefore qualitative analyze is required.
- Standing broad jump – this parameter determines the muscular leg power translated by the ability to reach to a greater distance. Nevertheless, the differences between the change in performances of both fencing and control groups, are nearly identical and it seems that the attempt invested in fencing footwork yield similar results as the attempt invested in general

- PA as running, playing field games and alike.
- Arm bent - this parameter determines the muscular upper body development which is definitely not one of the necessary fencing requirements therefore the inferiority of fencing training program is quite explainable.

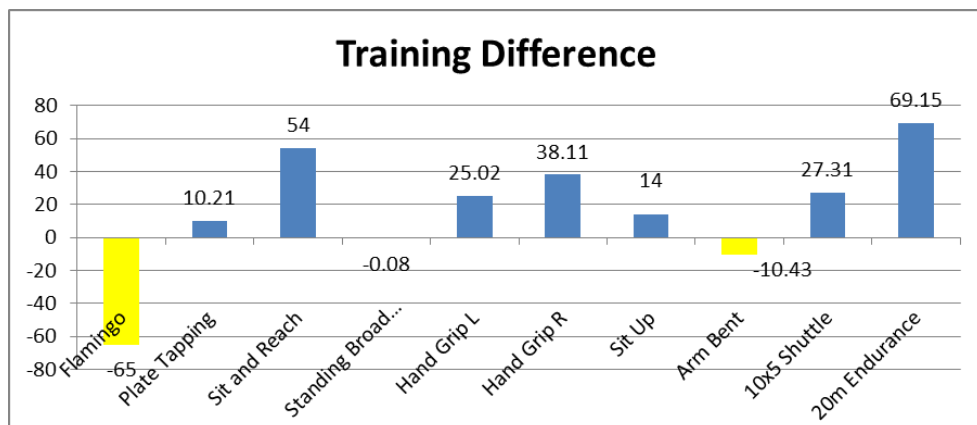


Figure 11. Differences between the effects of intervention programs in the Fencing group and control physical activity group

Considering that the study was conducted during a school year, taking into account that somatic changes occur during this period due to the growth and development of children, BMI undergoes changes. Table 9. emphasizes the BMI approximate percentile values according to the CDC (Centres for Disease Control and Prevention) chart, although other similar charts are also available, for instance WHO (World Health Organization). The values indicate better stability of the anthropometry factor on the fencing group (about 3 scales for the girls and 15 scales for the boys), compared with the control group (about 25 scales for the girls and 28 scales for the boys), the meaning is that the fencing program seems to be more effective in fighting obesity, which has major implications for all aspects of life. One of the aspects found to be influenced by BMI, is ADHD as investigated by P.A. Graziano et. al (2012) who explored the link between pediatric obesity to ADHD.

Table 9. BMI Percentile Values

Assessment	Fencing Group		Control Group	
	Girls	Boys	Girls	Boys
Initial	75	63	45	50
Final	78	78	70	78

CONCLUSION

Fencing training program yield higher impact on Physical Fitness than the control group undergoing PA training program as reflected from the Eurofit Physical Fitness Test Battery.

The research examined the effect of a fencing training program on Mf youth population diagnosed Attention Deficit Hyperactivity Disorder (ADHD), as reflected by Eurofit Test Battery results. The study population (N=40) children diagnosed with ADHD was divided into two groups (N=20, 10 boys and 10 girls): one is the experimental fencing training group applying fencing training program combined with general physical activity program the second, the Physical

Activity (PA) control group undergoing only a Physical Education (PE) training program - all groups, applied research program duration of 9 months, twice a week 90 minute each time.

The aim of the research was to explore the existence of extra value in fencing training program over General PA program, and the presumption was proven in both physical parameters as reflected from the Eurofit Physical Fitness Test Battery.

The outcome consequences of the Eurofit Test Battery results at the end of the research compared to the initial results, support superiority in improving the physical fitness of the Fencing Training Program of ADHD diagnosed children over the control group on most tests. Noticeable the difference overtime of: Sit and Reach (FG 53 vs. CG -1), Hand Grip Right (FG 128.2 vs. CG 90.09), Hand Grip Left (FG 122.38 vs. CG 97.36) and 20m Endurance (FG 100.9 vs. CG 31.75) tests. On the other hands, the control group undergoing PA Program achieved slightly higher results in the Arm Bent (CG 125.82 vs. FG 115.39) and in Flamingo Balance tests (CG 161 vs. FG 96). One of the explanations for the results of the Arm Bent is that fencing training doesn't include exercise for developing static fitness skills because it is not needed for fencing. The flamingo test as we indicated before can-not be measurable analyzed because the null scoring is giving both to the best and worst performances.

Excluding the controversial balance performance assessed by the Flamingo Balance test and the muscular leg power which seems to yield identical results for both fencing and control group as assessed by the Standing Broad Jump test (CG 3.42 vs. FG3.5), only the upper body power development is neglected by fencing training program from the same reason mentioned before while all other fitness components are well taken care as the fencing controlled skills are necessity. In addition, the anthropometry factor as evaluated by BMI indicates evidently more stability for the fencing training program that may be not only as a result of the physical training but also a behavioral side effect of fencing as a competitive sport demanding high devotion and self-discipline.

Further research in the field for evaluation of the extended benefits yielding from fencing training program is recommended by accomplish similar research with same population for a shorter period of time and increasing the number of training lessons per week and the number of samples. Other alternative could be similar research with different types of population, for instance normal children and other behavioral disorders for instance Obsessive Compulsive Disorder (OCD), Oppositional Defiant disorder (ODD).

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SOURCES OF INFORMATION, LOCATION AND REPUTATION OF A UNIVERSITY CENTER – KEY FACTORS FOR DECISION-MAKING TO BE TRAINED AS A PHYSICAL THERAPIST AT "VASILE ALECSANDRI" UNIVERSITY OF BACAU

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Abstract: Career orientation, factor analysis in making a decision, but also sometimes strong indecision in making a final decision, can constitute complex aspects of a process involving completely the person envisaging a professional career in a particular field. Making a decision involves a previous accumulation of information, but it also depends on less controllable factors (social, financial, material). This study aimed to analyze a series of aspects concerning the influences of various factors, influences that made 92 candidates choose to train professionally as physical therapists at the "Vasile Alecsandri" University of Bacau, during the main admissions in the summer of 2016. The candidates' opinions were collected using a 12-item questionnaire. This was administered before the admission examination. It can be concluded that at the "Vasile Alecsandri" University of Bacau, in making the decision, the candidates who chose to train as physical therapists, the influence of the human factor is significant in the finalization of the orientation process.

Key words: decision, factors, profession, physical therapist

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INTRODUCTION

Motivation represents the factor determining the body to act and focus toward other purposes (Șoitu, 2013). Also called the "engine" of the entire human activity, motivation is at the basis of one's contact with the world process (Zlate, 2009), the foundation of all human decisions, including the ones regarding the choice of a career. Often enough, the people entering this decisional process remain at one of the base components of motivation - the preference, not passing to the initiation and engaging stages.

For some of the admission candidates, the career decisions have a deeply subjective motivation, their choice or preference for a certain profession being influenced by their personality type, the objectivity of their self-assessment, etc. (Constantin et al., 2008).

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Indecision influences the career decision, through a sometimes too deep analysis of the intrinsic factors (individual values, skills, aspiration, needs) and/or extrinsic factors (social context, reputation of the training center, financial benefits, conditions and terms of the institutions, location, etc.).

On the other hand, the efficiency in making a career decision is determined by the trust of individuals, which would generate behaviors involving the engagement of individuals in activities associated with choosing a professional path or a career training path (Taylor & Betz, 1983).

The professional training engagement could be influenced by a personal model of making the career decisions (Gati, 1986), a model in which each individual eliminates sequentially the occupational alternatives in order to reach certain decisions regarding their career; overcoming the obstacles encountered by the candidates during the information process about the physical therapist profession (Mareş, 2017).

There are multiple factors influencing the choice of a career path based on higher education, this being highlighted clearly in the professional literature. Starting from the personal characteristics (McManus et al., 1996; Soethout et al., 2008; Vaidya, 2004), their gender (Crişan and Turda, 2015), specialized human resources (teachers, former graduates – Bălan, 2013), the factors influencing the decision of choosing a career can arrive to the perceived benefits and the attractiveness of certain study programs or specializations (Kiker and Zeh, 1998; Zinn et al., 2001; Arnold, 2005) and even factors associated with school programs and experience of the chosen specialization (Zinn et al., 2001; Ward, 2004; Maiorova et al., 2008; Stagg, 2009).

The elimination of the orientation alternatives toward certain professional training is based on the analysis of the intrinsic or extrinsic motivational factors, each factor having its importance, on the subjective or objective scale of each individual.

RESEARCH PURPOSE

This study aimed to analyze a series of aspects concerning the influences of various factors, influences that made 92 candidates choose to train professionally as physical therapists at the "Vasile Alecsandri" University of Bacau, during the main admissions in the summer of 2016.

HYPOTHESIS

Starting from the fact that today the internet offers essential data for the educational offer of every university and that getting information from the virtual environment is prevalent, especially among young people, one can presume that making the decision to train as a physical therapist was influenced also by the online sources of information.

Taking into account that high school graduates, as the main category of candidates for higher education admission, are still dependent on the material and financial support of their family, one can presume that home would be one of the main factors influencing the decision to choose the location considered by the candidates wanting to be trained as physical therapists.

Success in the future profession would be guaranteed also by the quality of the education in the university where an individual is training. Starting from this premise, one can presume that the reputation of the "Vasile Alecsandri" University of Bacau can be a strong factor in influencing one's decision to professionally train as a physical therapist.

MATERIAL AND METHODS

The subjects were 92 candidates (34 males, 58 females) who chose to be trained professionally as physical therapists at the "Vasile Alecsandri" University of Bacau (UBC), during the main admissions in the summer of 2016. The subjects expressed their agreement to participate in this research.

The age distribution (N=92) of the subjects was as follows: 18 y.o. - 23.91%, 19 y.o. - 28.26%, 20 y.o. - 7.61%, between 21-25 y.o. - 16.30%, between 26 - 30 y.o. - 9.78%, between 31 - 40 y.o. - 10.87%, between 41 - 50 y.o. - 3.26%.

Out of the 48 subjects (52.17%) aged between 18-19, 89.58% (43 subjects) have graduated high-school in the summer of 2016, right before the main admissions that were the basis of this study.

The time from when the subjects ended their high school studies to the 2016 admission was between 0 years (the year when the research was conducted - 2016) and 29 years (1 respondent who graduated high school in 1987).

The research instrument was a 12-item questionnaire, applied before the admission examination. The questionnaire items comprised either choosing certain answers from a list, or writing other options than the ones presented, or freely expressing certain arguments that formed the basis for the subjects' decision.

RESULTS

The analysis of the first item asking the subjects directly to say why they have chosen to study physical therapy allowed the following observations:

- for 40.21% of the subjects, the decision to train as physical therapists was based on their "attraction for this field", or "the desire to have a career in this field" (Figure 1);
- "a profession for the future" and "successful profession" represented other two basic reasons for which 17.39% of the candidates chose to enroll in the physical therapy and special motor skills program at the university studied in this research;
- for 13.04% of the subjects, the decision to train as physical therapists was motivated by the desire to "help people", to "offer help to the people needing rehabilitation" and to "help the people with health problems" (Figure 1);

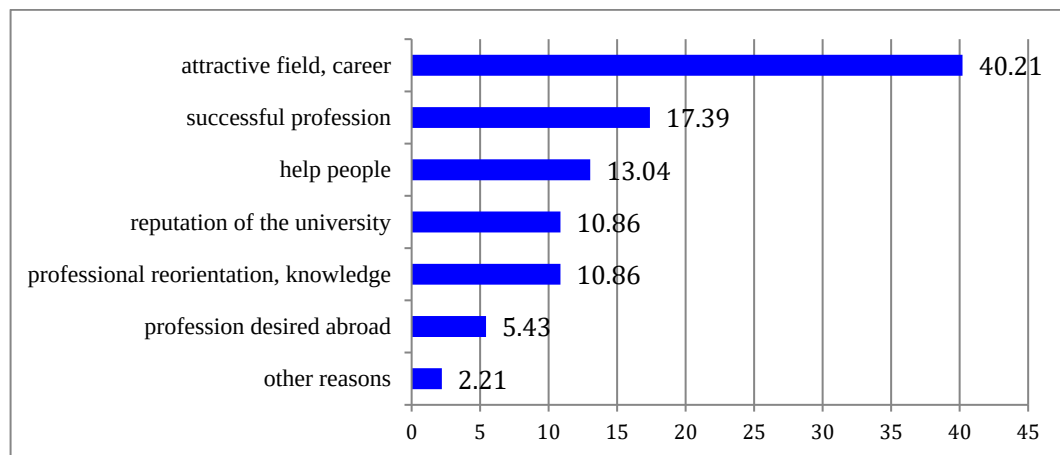


Figure 1. The ranking of the subjects' reasons to enroll in physical therapy university studies

- "the reputation of the university" represented a reason for which 10.86% of the subjects chose this program;
- for 10.86% of the subjects, the decision to train as physical therapists was based on "professional reorientation" and "gaining more knowledge" (5 subjects already working in the therapeutic, medical field);

- "it's a profession desired abroad" represented a reason for which 5.43% of the subjects chose this program;
- the rest of approximately 2.21% chose to enroll in this study program for other reasons, but not going over 2.00%.

The analysis of the information source as a possible dominant factor in making the decision to train as physical therapists, for the subjects of this research (item 2) envisaged the identification of the main information ways of the candidates. They had the opportunity to tick one or more of the following answer choices: high school teachers/school counselors, promotion of the educational offer by the universities, friends/acquaintances, graduate students of physical therapy, internet - the universities' websites, and internet - social networks. In order to determine the variety of the information sources or the importance of certain sources in making the decision, the questionnaire did not specify the number of answer choices that a subject can tick. Thus, for item 2, the analysis of the data revealed the following aspects (figure 2):

- "friends/acquaintances" represented a source of information that has determined the subjects' enrollment in the 2016 admission session in 45.65% of the cases;
- "graduate students of physical therapy" represented a source of information for 33.70% of the subjects;
- "high school teachers/school counselors" represented a source of information for 9.78% of the subjects;
- "promotion of the educational offer by the universities" represented a source of information for 7.60% of the subjects;
- "internet - the universities' websites" represented a source of information for 19.57% of the subjects;
- "internet - social networks" represented a source of information for 3.26% of the subjects;

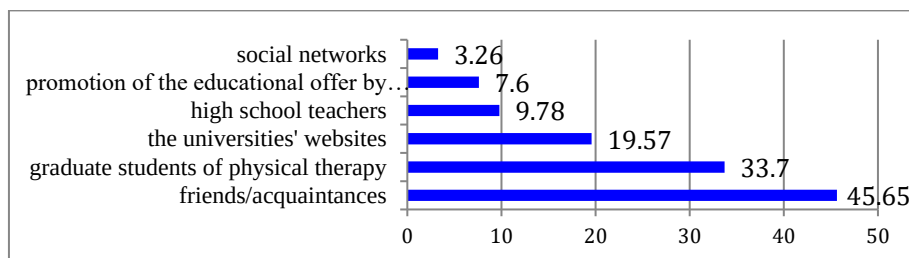


Figure 2. Ranking of information sources according to the subjects' opinion

Analysis of item 5 ("What made you choose the study program 'Physical therapy and special motor skills' at the "Vasile Alecsandri" University of Bacau?") allowed the calculation of the subjects' determining reasons in making the decision to enroll in this university. As one can see in figure 3, the reputation of the "Vasile Alecsandri" University of Bacau in the field of physical therapy represented a determining reason for which 29.35% of the subjects chose to enroll in this university in the summer of 2016. This importance, given by the reputation of the university, is due, in the authors of this paper's opinion, to the fact that this university has the only accredited part-time physical therapy and special motor skills of Romania. This is a determining reason for 11.11% of the subjects.

The subjects' home being close to the "Vasile Alecsandri" University of Bacau (16.30%), the fact that physical therapy is considered a successful profession (15.21%), and the subjects' attraction to this field (13.04%) represented other determining reasons (figure 3). For 10.89% of the subjects, other reasons were determining in choosing to train as physical therapists at the "Vasile Alecsandri"

University of Bacau (the individual values did not go over 2%; examples of reasons: acquaintances in Bacau, friends who are students at this university, continuation of high school studies done in Bacau with university studies also in this city, recommendations from other people who have indicated this university, etc.). Helping people (9.78%) and gaining more knowledge (5.43%) represented two determining reasons, but ranked lower in the total expressed options.

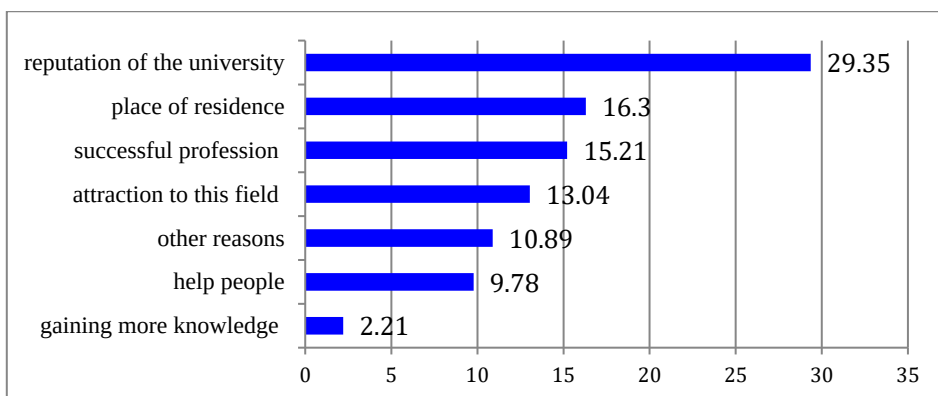


Figure 3. Ranking of the main reasons in choosing the study program at the 2016 admission

Item 6 - "What is the closest university to your place of residence?" and item 7 - "Was the distance between your place of residence and the university a criterion in choosing the study program Physical therapy and special motor skills at the "Vasile Alecsandri" University of Bacau?" envisaged both to determine the closest university from the subjects' place of residence, and the possible correlation between their place of residence and choosing the university where they can study physical therapy and special motor skills.

The analysis of the item 6 data indicated that for 86.96% of the subjects, the "Vasile Alecsandri" University of Bacau was the closest one to their place of residence, the rest of 13.04% of the subjects being closer to universities of Iaşi (6.52%), Braşov (2.17%), Galaţi (2.17%), Bucharest and Grenoble - France.

For 51.09% of the subjects (figure 4) having their place of residence closer to the "Vasile Alecsandri" University of Bacau represented a criterion in choosing to train as physical therapists at this university. The data analysis shows that for 48.91% of the subjects, the distance between their place of residence and the "Vasile Alecsandri" University of Bacau did not represent a criterion in choosing their university. Thus, one could say that the distance between the subjects' place of residence and university was an essential factor in their decision to train as physical therapists.

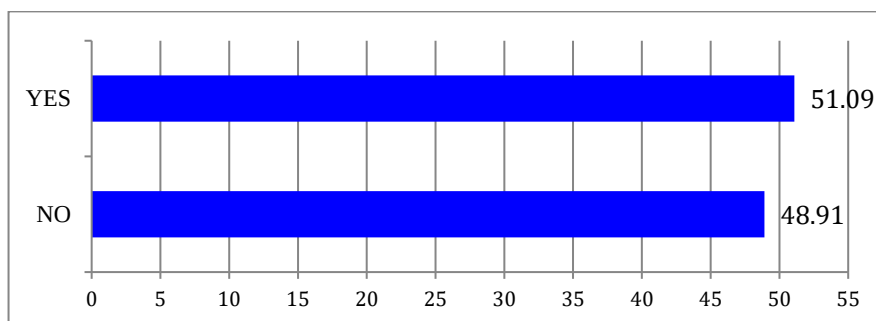


Figure 4. Percentage ranking of the importance of the distance between the subjects' place of residence and university in choosing to train as physical therapists at the "Vasile Alecsandri" University of Bacau

Taking into consideration that for 16.30%, the university being close to their place of residence was a determining reason, for 51.09% the distance from the university was a criterion in choosing it, and 86.96% of the subjects have their place of residence close to the "Vasile Alecsandri" University of Bacau, it can be said that the distance between place of residence and university represented an essential factor in the subjects' choice to train as physical therapists.

From the perspective of the subjects choosing their career path based on the reputation of other universities compared to the "Vasile Alecsandri" University of Bacau, item 8 asked the subjects "Did you apply to multiple universities of study programs during this session - July 2016?". The analysis of the answers show that only 8.70% of the subjects applied also to other universities during the admission session of July 2016, for 91.30% of them, the "Vasile Alecsandri" University of Bacau being the only choice.

In order to determine whether the reputation of the study program "physical therapy and special motor skills" from the "Vasile Alecsandri" University of Bacau would be a possible decision factor for the subjects, item 10 asked them what are the reasons why they decided to enroll in the "Vasile Alecsandri" University of Bacau and not another university from North-East or South-East of Romania, an university that also had this program and it wasn't very far from the subjects' place of residence (e.g.: Constanța, Galați, Suceava, Iași).

The data analysis indicated that for 45.65% of the subjects, being close to their place of residence counted the most in choosing the Bacau university. 43.48% of the subjects chose the Bacau university instead of the other 4 universities offered as answer choices (Constanța, Galați, Suceava, Iași), to train as physical therapists, due to its reputation. Other reasons represented 10.87% (figure 5).

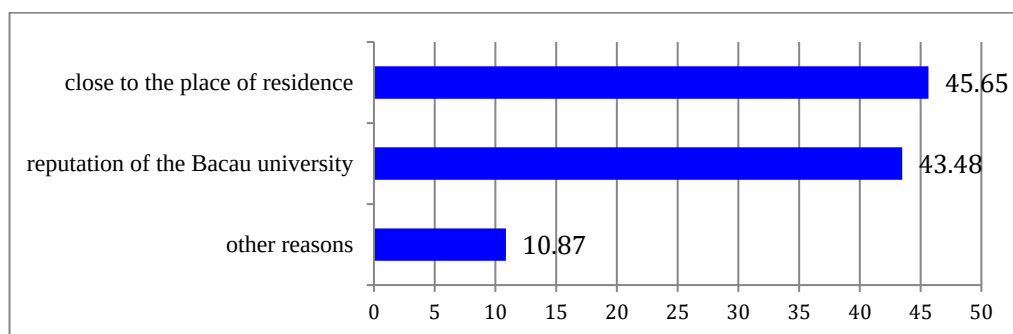


Figure 5. Reputation - a reason for choosing the Bacau university, compared to other universities

As figure 5 shows, the reason "being close to the place of residence" is chosen by 45.65% of the subjects, which indicates the important role played by the place of residence in the subjects choosing to train as physical therapists. This aspect could be interpreted also as follows: place of residence can represent an important factor why a large part of the subjects chose the Bacau university and not another one, this choice not being based necessarily on the university's reputation.

If the other 10.87% are taken into consideration, representing other reasons outside reputation, for which the subjects did not choose another university, it can be said that over 50% of the subjects (56.52% to be precise) did not consider "reputation" as a criterion of enrolling to the "Vasile Alecsandri" University of Bacau to study physical therapy.

However, a percentage of 43.48 for reputation, of the total reasons for which the subjects chose the Bacau university, indicates a high level of image and respect that the program "physical therapy and special motor skills" of the "Vasile Alecsandri" University of Bacau enjoys.

In order to verify the relevance of the proximity criterion, these authors wanted to determine how firm was the subjects' decision to train professionally when they chose in 2016 to enroll in the program physical therapy and special motor skills. Item 11, "If at the "Vasile Alecsandri" University of Bacau there would be no graduate studies of physical therapy, would you have studied this subject at another university or would have chosen another program still at the "Vasile Alecsandri" University of Bacau?", tried to verify this fact. The analysis of the data for item 11 showed that 67.39% of the subjects would have still enrolled in 2016 in the physical therapy program, but at another university (figure 6), in the Bacau university would not have offered this program. This percentage indicates that two thirds of the subjects were intrinsically motivated in their decision, the proximity criterion not having a significant influence.

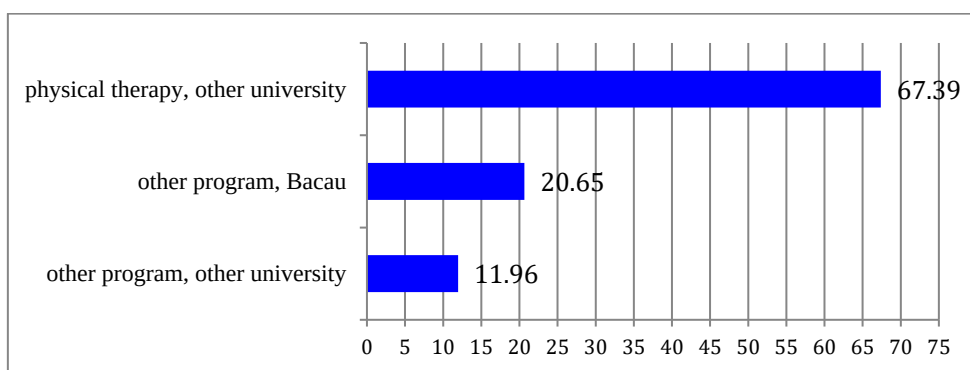


Figure 6. Firmness when making a decision, reputation, and home- important factors in choosing the professional training

Figure 6 shows also that 20.65% of the subjects would not have chosen another university to train as physical therapists and would have chosen another program of the Bacau university. This aspect can be interpreted from multiple perspectives:

- *economic* - the impossibility of ensuring the subjects' lodging over the course of their studies, lacking the adequate finances;
- *social-relational* - emotional attachment to the support groups (parents, friends);
- *motivational-personal skills*. The study program was chosen on the basis of other criteria than interests, skills, and personal values;
- *the general reputation of the Bacau university*.

Thus, the data presented in figure 6, as a result of the analysis of the answers to item 11, confirm the tendencies highlighted by subjects in the other items, validating the subjects' attitude in their answers.

DISCUSSIONS

The subjects' place of residence and the reputation of the university could be two factors influencing their decision to train as physical therapists in a certain geographical area. The values calculated for these two factors are confirmed also by other similar studies (Bălan, 2013), the percentages being very close (as values, but not as representation of the category of the respondents), taking into account that the studies were conducted in separate universities.

Both the information sources and their ranking, analyzed on distinct criteria, can vary, not being able to be considered constants. Thus, although the information sources offered as variables in the research instruments are almost the same, some researches conducted on the Romanian population, on the same category of subjects (young, recently enrolled students - Bălan, 2013) indicate different rankings of the values, compared to the rankings recorded in this study.

Practically, for the subjects of this research, the decision to study physical therapy was based mainly on the data offered by friends or acquaintances, followed by physical therapy graduates, while in other studies, the universities' websites and brochures were the main sources of information (Bălan, 2013).

CONCLUSIONS

Although today the internet and the media offer essential data regarding the educational prospects, data referring to a potential career path, there are certain categories of young people (who want to train as physical therapists) for whom the main source of information is completely different - their support groups (friends, close acquaintances). Together with these groups, the opinion of the teenagers who trained in the same profession is one of high significance. These observations reject the first hypothesis. This aspect can be interpreted as a diminished influence of the online information sources for the young people wanting to train as physical therapists.

Based on the recorded results, one can conclude also that the subjects' motivation for enrolling in the study program physical therapy and special motor skills would be intrinsic, the arguments for this choice being the result of a previous information correlated to a series of personal values such as altruism, desire to help people, or desire to know more. However, taking into account that in the North-East region of Romania (from which most of the subjects originated) the high school graduates, being the main category of candidates for university enrollment, are still dependent on their families for material and financial support, the authors of this study determined that the variable "place of residence" can be one of the main factors that could influence the subjects' decision to choose a particular location to train as physical therapists. This conclusion confirms the second hypothesis.

Success in a future profession can be guaranteed also by the quality of education in the university where an individual chooses to study, a fact that was confirmed also by this study. The recorded results have confirmed also the last hypothesis of this research, highlighting the fact that the reputation of a university (in this case, the "Vasile Alecsandri" University of Bacau) can be an influencing factor in deciding to train as a physical therapist.

LIMITATIONS OF THE STUDY

The study has an observational quality, and its results cannot be extrapolated and presented as relevant for the identification of the reasons of all candidates that have enrolled during the 2016 session. The relevance of this study refers only to the aspects that have led the subjects to choose the "Vasile Alecsandri" University of Bacau as a place to train as physical therapists.

Another limitation of this research is caused by a lack of such previous studies, which would have helped in the comparative analysis of the reasons and tendencies of the subjects who choose an university to train as physical therapists.

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THE INFLUENCE OF SPORTS AND PHYSICAL ACTIVITY ON THE METABOLIC SYNDROME: A SYSTEMATIC REVIEW

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Abstract: Metabolic Syndrome (MS) is one of the most significant causes of world death rate, associating several abnormalities: increased values of blood pressure, blood glucose, lipid metabolism disorders and obesity, or large abdominal circumference. In an attempt to decrease the burden of this pandemic disease by implementing more effective prevention and treatment strategies, numerous clinical trials have been conducted in order to establish a proper therapeutic course, also by using physical activity as the central link to treatment. Given this background, we have analysed the recently published data, strictly focusing on the significance and benefits of the physical activity over patients with MS. The conclusions that have emerged have highlighted that sport and physical activity play a major role in the management of the Metabolic Syndrome, both in improving all components as well as in some cases determining its reversibility.

Key words: Metabolic Syndrome (MS), physical activity, movement, prevention, sport

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INTRODUCTION

Metabolic Syndrome (MS) is currently a significant cause of world death rates (Sung et al., 2015) because it doubles the risk of atherosclerotic cardiovascular disease and increases five times the risk of diabetes mellitus type 2 (Grundy et al., 2005). Given the characteristics of modern society, highly urbanised and mechanised, where physical activity and effort have decreased considerably, in parallel with the excessive ingestion of hyper-caloric foods and sedentary lifestyles, there has also been an increase in obesity. Obesity is one of the most significant links of MS and it is a combination of metabolic imbalances. The literature review and observations made over time have highlighted the direct link between sport, namely physical activity, and the positive implications in preventing and mitigating the effects of the metabolic syndrome. Moreover, sport and physical activity are essential life elements with beneficial health implications (Tătar et al., 2018; Warburton et al., 2006; Haskell et al., 2007) and psychosocial behaviour (Shephard, 1991; Wankel and Berger, 1990, 1991). Among the psycho-social benefits, we can name the following: increase in life quality (Kozma, 2014; Ilieș et al., 2014; Guo et al., 2018), increase in self-esteem (Vella et al., 2016), reducing depression and anxiety (Camliguney

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et al., 2012; Muñoz-Bullón et al., 2017), etc., while among the ones related to the improvement of health one can notice the prevention and mitigation of the effects associated with cardiovascular diseases (Warburton et al., 2006; Berlin and Colditz, 1990; Macera et al., 2003; Oguma and Shinoda-Tagawa, 2004), diabetes (Gregg et al., 2003; Helmrich et al., 1994; Laaksonen et al., 2005); cancer (Holmes et al., 2005; Rohan et al., 1995); osteoporosis (Berard et al., 1997; Carter et al., 2001; Kujala et al., 2000; Wolf et al., 1999; etc.).

From all of the above, it results that the concerns of scientists regarding the link between physical activity and the Metabolic Syndrome are relatively recent, being closely related to the changes that occurred at global and local level, with the passing of human society from a primary economy (based on endosomatic tools and movement) to a tertiary type focused on exosomatic instruments and artificial intelligence (Herman et al., 2017; Ilie et al., 2017; Ilieș et al., 2017; Masteikiene and Venckuviene, 2015; Pekarskiene and Susniene, 2014; Simonceska, 2012). On this background, once with the increase in the population's standard of living, associated with the increase in obesity and its related disorders, experts have begun to recommend doing sports or physical activity for preventive purposes.

WORKING METHODOLOGY

This study is the result of the specialized bibliographic research and of international databases (pubmed, medscape) regarding the physical activity and its role in the prevention and treatment of the metabolic syndrome. Thus, the conceptual model of the study 'The Influence of Physical Activity on the Metabolic Syndrome' has been aimed at the following defining aspects: establishing the scientific context, definition and historical evolution of the concept of metabolic syndrome, epidemiological dimension of the metabolic syndrome, overweight / obesity treatment through physical activity and conclusions.

DEFINITION AND HISTORICAL EVOLUTION OF THE 'METABOLIC SYNDROME' CONCEPT

The 'Metabolic Syndrome' concept was first approached in the last century and underwent continuous mutation over time, from a terminological point of view, in close correlation with the progress of research in the field. Thus, it was known as 'the Reaven Syndrome', 'the X Syndrome,' 'Dismetabolic Syndrome,' 'Obesity Syndrome', 'Deadly Quartet,' etc. In 1988, Reaven described 'Syndrome X' and introduced for the first time the term of 'insulin resistance' related to patients with a high blood pressure, dyslipidemia and compensatory hyperinsulinemia. Since then, on patients with previously listed dysfunctions, it has been observed that they would be prone to a higher risk of cardiovascular disease (Reaven, 1988). Then there followed several names and changes, until 1999 when WHO introduced the notion of 'Metabolic Syndrome' defining for the first time the Insulin Resistance Syndrome (World Health Organization, 1999). Subsequently, there were numerous debates and proposals on the term 'MS' because there were many controversies, so that in 2009 the competent international organizations (International Diabetes Federation - IDF, National Heart, Lung, Blood Institute - NHLBI, American Heart Association - AHA, International Atherosclerosis Society - IAS, World Heart Federation - WHF) met and proposed a consensual description of 'MS', namely the presence of at least three of the following defining criteria for MS (Eckel et al., 2010): abdominal obesity: waist circumference > 80 cm for women and > 94 cm for men, for the European population (102 cm for men, 88 cm for women for the American population); high blood pressure: systolic BP $\geq$ 130 mm Hg, diastolic BP $\geq$ 85 mm Hg or use of anti high blood pressure medication; low serum values of lipoproteins with high density: low HDL - cholesterol (< 40 mg / dl on men and < 50 mg / dL on women); hypertriglyceridemia ($\geq$ 150mg / dl); or the use of lipid-lowering medication; glycemia à jeun $\geq$ 100 mg / dl or antidiabetic treatment.

EPIDEMIOLOGICAL DIMENSION OF THE METABOLIC SYNDROME

SM prevalence varies depending on the geographical area, social and economic factors, gender, age, race, but it seems that about 25% of the adult population of the world suffers from MS (O'Neill and O'Driscoll, 2015) being considered a real pandemic, a real burden, also from a financial perspective, due to comorbidities and its evolution (Aguilar et al., 2015). Also, the MS prevalence has grown in parallel with the increase in global obesity among adults and teenagers/children, becoming a major public health concern. According to data published by the World Health Organization (WHO) in 2016, about 650 million adults were obese, representing about 13% of the worldwide population (World Health Organization, 2017). Obesity is a determining factor in the development of many chronic conditions, such as diabetes mellitus, cardiovascular diseases, cancer and musculoskeletal diseases. Obesity is considered a multifactorial disease, being the result of interaction between genetic, environmental and behavioural factors. A sedentary lifestyle and food imbalance represent the main causes of obesity, which is reversible if changes in lifestyle are made. For the assessment of obesity, one uses the body mass index (BMI), which assesses the total adipose tissue (except for athletes with significant muscle mass). People with a BMI over 25 kg / sq.m. are considered to be overweight, and people with a BMI of over 30 kg/sq.m. are considered to be obese. The body mass index is calculated according to the formula: $BMI = \text{weight (kg)} / \text{height (sq.m.)}$.

For this reason, currently, a growing significance is given to obesity, both in the ethiology of MS complications as well as in its treatment, being the first step on which one acts, both in the prevention and in the treatment of MS. Prevention of MS actually represents the prevention of obesity, of the central factor in this pathological constellation, because the prevention and treatment of obesity represents the simplest, non-pharmacological, useful and widely available method with significant results in the prevention and recovery of patients with MS.

Schematically, the MS treatment is initiated with recommendations for changing the atherogenic food/ diet, of unhealthy habits, of the sedentary lifestyle, prevention against overweight and obesity, smoking cessation, currently being known that acting over these modifiable factors one decreases in fact the risk of cardiovascular disease and mortality (Rizzuto and Fratiglioni, 2014). The diet will have to be one low in calories, a significant restriction of calories (about 1.000 calories / day), often requiring the help of nutritionists. The most favourable diet, according to the studies, seems to be the Mediterranean one, which has low carbohydrates content, but opts for increasing the daily consumption of whole grains, fruits, vegetables, nuts and olive oil, namely an increased content of fibres and proteins of plant origin (Bach-Faig et al., 2011; Martinez-Gonzalez et al., 2015). Subsequently, when the first measures do not give the expected result on non-compliant patients and / or on whom the gravity of the medical conditions imposes it, one shall also use the medicines treatment. Since currently there is no single pharmacological agent acting precisely on the pathophysiological mechanism of MS, specific medicines will be used in order to treat each MS component, thus BP shall be decreased when it exists, dyslipidemia shall be treated (by using statins, fibrates, and, if necessary, ezetimib and nicotinic acid), hyperglycaemia and insulin resistance will be treated. In carefully selected cases on those with morbid obesity (with BMI over 35kg /sq.m.) and refractory SM one may also consider bariatric surgery (Busetto et al., 2017).

TREATMENT OF OVERWEIGHT / OBESITY THROUGH PHYSICAL ACTIVITY

As shown by recent studies (Park et al., 2013; Gerstel et al., 2013; Greenfield et al., 2014), in order to avoid the therapy cessation, the first step will consist in providing counselling and education for the patient in order for him to become aware of the central role of the lifestyle changes and of the sustained physical activity, determining him develop his own regular schedule of physical activity and movement until it becomes a habit / lifestyle. MS pathophysiology is closely linked to the positive energy balance, and the fat excess is deposited in the adipose tissue and in ectopic tissues (e.g. liver, skeletal muscles, pancreas, and on internal organs) (US Department of Health and Human

Services, 2008). The new lifestyle should consist in increasing the physical activity along with reducing the energy consumption, namely the diet, these together being the most useful tools both to prevent and to treat MS. Benefits of physical activity: decreases the blood glucose, insulin resistance, increases the tissues sensitivity to insulin; improves the lipid profile; weight loss and abdominal circumference; decreases / normalizes BP values; glucose is used in the muscle tissue, decreasing the liver production; improves the cerebral circulation and increases the self-esteem and the perception over one's own person (Gerstel et al., 2013; Ekelund et al., 2015; Ilanne-Parikka et al., 2010).

There remain a lot of questions regarding the physical activity: how long should it be performed daily? / During which period of life? / With what intensity? / What are the most effective exercises? / Which muscle groups should be used the most? and etc. However, following the several observational studies, one reached the conclusion that any type of physical activity is beneficial, and any kind of movement will be encouraged. Empirically, one initially recommends 30 minutes a day, at least 5 days/week, the physical activity will subsequently be increased, depending on the tolerance of up to 60 minutes / day, the aerobic exercises and those that train large muscle groups being preferred. There is a close relationship between the physical activity and the health condition, benefits which are even higher when the minimum daily motion recommendation is exceeded (Pedersen and Saltin, 2015; Pattyn et al., 2013). WHO recommends (between 18 and 65 years) to perform minimum 150 minutes per week of moderate physical activity or, alternatively, 75 minutes per week of intense physical activity or a combination of the two (World Health Organization, 2010). Exercises of Moderate intensity are enough to decrease the cardiovascular risk, but it seems that the physical effort of a higher intensity provides greater benefits (Pattyn et al., 2014). Various aerobic training programs have been developed that use various schemes of intense exercise, some with a duration of less than 45 seconds or between 1-8 minutes of moderate intensity, followed by recovery breaks.

Given the society of the third millennium, technology and the relatively easy access to the internet, on the one hand, and the significance of MS for public health, on the other hand, interventions over the lifestyle must be effective, available and accessible to high-risk individuals. The technology of our century provides unique opportunities, such as Internet programs for developing and implementing interventions in lifestyle, physical activities at home, promoting feedback and self-monitoring (Jahangiry et al., 2014; van den Brekel-Dijkstra et al., 2016; Hansen et al., 2012). Also, to be mentioned Lin et al. who have recently shown outstanding results by using phone-based motivational interviews in a group of changing the lifestyle in a clinical trial consisting of women with MS and sedentary lifestyle, thus the women of the experimental group have increased their physical activity weekly, the percentage of those diagnosed with metabolic syndrome has decreased to approximately 81% and the number of metabolic abnormalities and abnormalities has decreased (Lin et al., 2016).

In an attempt to find and implement MS prevention and treatment programs, in order to meliorate the economic burden due to MS, numerous clinical trials have been carried out that have focused on the physical activity and diet. Thus, it has been observed that a multidisciplinary, patient-centred collaboration is necessary and effective. Highly valuable results were registered, for example, by the study CHANGE (Canadian Health Advanced by Nutrition and Graded Exercise), recently published, conducted in Canada on people diagnosed with MS, where a customized program of monitoring the diet and the physical activity was implemented. Patients were monitored for one year by a multidisciplinary team including the family physician, a dietician nutritionist and a physical therapist. It was followed if after the completion of this program of diet changing performing aerobic fitness, MS can be reversible (namely patients should have less than 3 criteria out of 5) and/or if there is an improvement of MS components. The results achieved at the end of monitoring were very promising: on 19% of patients MS was revoked (because they no longer met the criteria), and all metabolic abnormalities have meliorated (namely the abdominal circumference, weight, values of BP, glucose, lipids in blood) and

significantly decreased the risk of acute coronary events, of acute myocardial infarction (based on the PROCAM score) (Klein et al., 2017; Jeejeebhoy et al., 2017).

The effects of physical activity and aerobic training were also studied, following various variables on patients with MS. It has been shown that it positively influences the heart rate, arterial stiffness on patients with MS and BP who perform aerobic training, improving the cardiac performance and the clinical and anthropometric profile of patients with MS, as shown by a study published in 2018 by Slivovskaja et al. In 2018 there have been studied the results of the first international multicenter trial EX-MET (Tjønnå et al., 2018), which assesses the effectiveness of general motion recommendations (according to the American Board of Sportive Medicine ACSM – of moderate intensity), and the effects of varying levels of aerobic training of much higher intensity but with a shorter duration (activities that use large muscle mass: running, canoeing, walking, cycling, swimming and skiing) over the risk factors that represent MS. The conclusion was that intense physical activity had better results in improving the cardiac, respiratory performance and improvement of SM parameters (Tjønnå et al., 2018).

CONCLUSIONS

In conclusion, we can assert that sport and physical activity represent a first step with a major role both in the prevention of MS as well as in its treatment. Being accessible to anyone at any time, they require the intensive, multidisciplinary promotion, starting with the primary medical system, media channels for population awareness over the benefits of the physical activity especially among people already diagnosed with MS or on those at a high risk of developing MS.

In spite of, "according to a survey carried out in 2017 (Special Eurobarometer Report, 472) two in five Europeans (40%) exercise or play sports at least once a week, while 7% do so regularly, i.e. at least 5 times per week" while "in the case of Romania as the study analysis shows the frequency levels of doing sports are low given that 63% of Romanians never practice sports while barely 6% of Romanians practice sports regularly. Reported to the European Union average 46% of its citizens never practice sports" (Tătar et al., 2018, p. 42).

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RELATIONSHIPS BETWEEN R.O.C. AND I.O.C. AND THEIR IMPACT ON THE ROMANIAN OLYMPIC SPORT (1920-1964)

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Abstract: The purpose of this paper is to accomplish a study regarding the relationships between the Romanian Olympic Committee (R.O.C.) and the International Olympic Committee (I.O.C.) from the perspective of archive documents, edited publications and periodics sources during the reference period. The proposed time interval it starts with measures and implications of the Romanian representatives in the olympic phenomenon such as: the proposal related to the reintroduction of rugby and volleyball in Olympic Games, increasing number of foreign coaches in our country, improving training conditions and image of the Romanian athletes in the world etc. Thus the main issues in this historical approach are oriented on the Romanian sport personalities, sport prizes and Romanian sport affirmation at the olympic level.

Key words: sports history, Romanian sports, olympism

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INTRODUCTION

"The Olympic Games have a history. And like any history, she created her own myths. It is time that gives to our deeds the dimension of the myth" (Goga, 1972, p. 7). The significance of time passing is raised to the rank of myth in the moment of considerable longevity, which puts a shadow of seniority upon the beginning, framing it in a mystery. It is the unknown who gives supernatural power to the confused origins created by a phenomenon, to highlight its greatness and, at the same time, the impossibility of its equation.

At the origin of the Romanian Olympism there are some main landmarks: the election of the first Romanian representative in the International Olympic Committee (I.O.C.) by George G. Bibescu (1899-1901), closely followed by George Plagino (1908-1949) and the establishment of the Romanian Olympic Committee (R.O.C.) in 1914. Then the winning of the first romanian olympic gold medals and the election of the longest-lasting romanian member in I.O.C, Alexandru Șiperco (1955-1999), points out essential moments that are part of the roots of the Romanian Olympism, starting with them the whole sports activity will be driven at the Olympic Games standard. The Olympic Movement founded on Romania's territory too, will give the start to the Olympic achievements by our athletes.

The R.O.C. is officially recognized in 1914. Chronologically we are the 22nd National Olympic Committee accepted by the I.O.C. (Matache, 2006). I.O.C. officially recognizes R.O.C. at the international forum during the XVIth session (Postolache, 1995).

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MATERIALS AND METHODS

In the elaboration of the paperwork we studied the national archive documents, periodic publications, as well as the content analysis of the data provided in the edited national and international sources of information.

The purpose of this historical study is to present and analyze the evolution of relations between R.O.C. and I.O.C., as well as the impact of these relations on Romanian sport in the context of the reference period.

ROMANIAN PERSONALITIES, PRIZES AND ROMANIAN SPORT DEVELOPMENT

The troubles caused by the belligerent nations and the adverse consequences produced by the First World War have also influenced the Olympic Movement. Modern Olympism was passing through moments threatening its division, which contributed decisively to a geographical orientation of I.O.C. to other territories less affected by the political interests of the time (Coubertin, 1989). In the interwar period I.O.C. begins to show interest in expanding sports competitions in order to promote Olympic ideals. The attention of the international forum includes the Games of the Far East and the Games of Latin America, launched in the interwar period (Henry, 1948).

In our country the personality involved in the international Olympic movement that would "lead the Romanian sport on the path of total recovery" will be considered George Plagino (Teatru și Sport, nr. 22, decembrie, 1944, p. 2). This trust is not limited to the Olympic segment but refers to a global reconstruction of sport at national level with a view of full development with world-class results. Elected as the 57th I.O.C. member, son of the ambassador of Romania in Paris, Plagino will propose the reintroduction of the rugby in the 1920s Olympic program. His social status, the president position in Romanian Shooting Federation, will constitute some favorable arguments to Romania's presence in the international sport arena. Our country obtains the right to appear on the list of official guests at the Belgian Olympics, even if later the Romanian delegation will not honor this call for financial reasons (Bucur Ionescu, 1986).

George Plagino has been in contact with the Olympic Games since their second edition. He will be later a member of the The Sporting Societies Federation of Romania (F.S.S.R.) and from 1919 he will be elected president of the Olympic Games Commission created in Bucharest, in order to the participation of the Romanians athletes at the Olympics in Belgium (Serbanescu, 1980). His entire sporting activity, managerial capabilities and professional competence have kept him close to what sports performance means, Olympic values, having the needed qualities by a real ambassador of the country.

In a periodic publication, Plagino's qualities are listed and described in a manner that shows a profound consideration: "Distinguished Athlete G. Plagino, who through the love and skill with which he permanently led this Sports Fora (U.F.S.R.) knew to impose a prestige and authority necessary for great achievements. Just what currently lacks in Romanian sport" (Teatru și Sport, 1944, p. 2). On the background of a sporting activity threatened by the danger of expanding the "made" results in football (Teatru și Sport, nr. 50, noiembrie, 1945, p. 2), "racing arrangements" (Teatru și Sport, nr. 48, decembrie, 1945, p. 2) and "smutty business" (Teatru și Sport, nr. 49, noiembrie, 1945, p. 2) that significantly distorts the destination of sport, there was need for a change that would save the degrading sport situation to which it was heading. The rescue solution was seen in the person of Plagino who had the necessary qualities to restore the damaged image of the sport.

The Olympic Congress held in Lausanne in 1921 marks a turning point in the Olympic activity by approaching the issue of amateurism. George Plagino and Dinu Cesianu, members of R.O.C. will represent Romania (Bucur Ionescu, 1975). The R.O.C. proposes in the same year the

opening of an Olympic Congress for the Balkan countries for good collaboration and sports training in the countries from this region. The proposal will be approved by I.O.C. the Congress setting up as points of debate the organization of inter-Olympic competitions with the participation of Polish, Yugoslav, Czechoslovak and Greek athletes (U.F.S.R. Anuarul sportiv, 1938-1939). As a result next year, in our country will take place an Olympic Congress of the Balkan Nations (Postolache, 1995).

For the Olympic Congress held in Paris (1924), the president of R.O.C. urgently appoints a Romanian representative, in the person of Mircea Ionomu. In the same year there will be an International Amateur Meeting. The Romanian Sports Federation calls for the participation of Ionomu, being a member of the Federation, to support the interests of Romanian sports (Mircea Ionomu Fund, file no. 5/1924), both as a sportsman and as an official delegate too.

The 1930s bring to the foreground the need for a global rethink of the idea of sport, that will bring into discussion the Sports Charter designed by Pierre de Coubertin. It will be translated into eight languages and will include an objective analysis of the sport situation and the factors involved in the sport phenomenon. Thus, there are mentioned some extreme indicators of the physical exercise in excess that pursuing different goals other than health, physical and intellectual harmony. The adverse influences of political power, sports federation leaders and the press (Gillet, 1970) are considered to be principally responsible for the decline of sports values.

In 1933, the awards in the field of sport was very en vogue. Thus Carol II receives the "Knight Cross of the Order of Sports Merit", but also the President of the Interbalcan Sports Committee and the Association of Hellenic Gymnastics and Athletic Societies, M. Rinopoulos is awarded with the same distinction (Postolache, 1995). This kind of sport rewards was initiated long before in the Olympic family, being taken over by our country too. So, in chronological order appeared the following distinctions: Olympic Diploma of Merit (1905), Olympic Cup (1906) - founded by Coubertin, Fearnley Cup and Trophy Mohammed Taher Pacha are established in the same year (1950) being trophies of I.O.C. members, follow Bonacossa Trophy (1955) founded by the Italian Olympic Committee and Count Alberto Bonacossa's family, the Tokyo Trophy (1964), The Olympic Gratitude Award (1972) and the Olympic Order (1974). These distinctions were created to be awarded to any man or sports institution that has made significant contributions to the propagation and development of Olympism. This principle aimed the universality and its shows that every effort is appreciated, either distinguished personalities, or National Olympic Committees and sports clubs, which by their implication and dedication were able to be role models for all the supporters of the Olympic Movement (Vrabie et al., 2002). We note that there are differences in the award of the Olympic prizes. Thus, at the onset of these Olympic awards, the name of the distinctions had a general Olympic character, but after the Second World War, this Olympic spirit channeled to certain Olympic personalities, nations or host cities, and finally returning to the universal Olympic character. The dynamics of Olympic interests followed a fluctuating process in the promotion, appreciation and rewarding of Olympic efforts, being sometimes dictated by conjunctions, specifically focused to a message that shows also colaterally Olympic interests. This situations can be argued by the confusing postwar periods of the Olympic Movement namely: on the one hand the need of the Olympic family to expand and perpetuate after a war that interrupted the event, and on the other hand ambiguity of the notion of amateur athlete create continuous discussions and tensions in the sports world.

I.O.C. presidents between 1896 and 1942, Pierre de Coubertin and his successor Henri de Baillet Latour (Bucur Ionescu, 1975) will receive from the R.O.C. the *Order of the Cultural Merit for Sport, first class knight* (U.F.S.R. Anuarul sportiv, 1938-1939). Count Baillet Latour will also be awarded with the "Order of Cultural Merit for Sport, Second Medal" as well as Carl Diem (U.F.S.R. Anuarul sportiv, 1939-1940).

Director of I.O.C., founder of the Higher School of Physical Education in Germany and editor of an Olympic periodical, Karl Diem, will visit Romania during the war (1943) (Postolache,

1995). Supporter of rigorous sports training, Diem said that "if the Olympian winner will take the sword, he will be more capable of fighting" and "if war is vanishing, evolution stops" (Alexeev, 1952, p. 49). In the context of the global conflagration, his claims and beliefs are partly motivated. On the other hand, Diem's reasoning as supporter of Olympism may seem less pacifist, perhaps even instigator at riot or division. According to the above mentions, the Olympic athlete is a fighter, a survivor in the most difficult trials, finds quick and optimal solutions to various challenges in the fight with sports records, being a precious human capital designed to be, to think and to act as a winner. So the war can be worring regarded as a "other sports arena". Indeed, there is a link between the sport and the preparation of the soldier, as Eisenhower said. "The war has shown that every good soldier has been tied to some sport. He was not supposed to be "a star" at all, often enough to have good sports training". This association of sport with war can mean both the application of physical training superior to soldiers to cope with war as effectively as possible, and the using of sport as a selection area for the army.

Three years before Coubertin's death opens at Lausanne the Olympic Museum. Previously, the Archaeological Museum of Olympia (Tudor and Ludu, 1985) had a tendency to immortalize and reunite sports values and symbols in a single institution: the Olympic one. Among the last impressions shared by the renovator Coubertin, in terms of the Olympic phenomenon, was one less worthy of his creation "The only true Olympic hero (...) is the individual male adult. Therefore, neither women nor team sports" (Meyer, 1960, p. 13). From the previous quote we observe a few aspects contrary to the ideals and principles of Olympism launched by Baron Coubertin: equality of chances in participation is preferential applied, the universality of games being directly affected; the recognition of human value is done in a way dictated by an individual ethic, not a social one.

Under the aegis of R.O.C., it will be carried out a movie about the Berlin Olympics (1936) (Anuarul sporturilor, 1939-1940). The event marks in our country the diversification of the possibilities for dissemination and information in this sports field.

In 1939, General Secretary of the Italian Olympic Committee, G. Vaccaro, was distinguished in Bucharest with "The Knight's Cross of the Order of Cultural Merit" (Postolache, 1995). Taking into account the moment of global tension in which the decoration of a member of the international Olympic movement is granted, we can consider it a powerful ambassador of crisis situations. At the same time, other arguments have been raised in favor to the previous assertions, aiming this time the improving of the Romanian-German relations. At the proposal of the Romanian Olympic Committee, efforts are being made to improve the Romanian-German ties through sport. German sports chief Hans von Tschammer und Osten and German Olympic Committee secretary Karl Diem were honorary guests in Romanian sporting events. The program covered both sporting and diplomatic activities.

Athletes' models launched by Olympics between the two world conflagrations will have a long resonance. Sonia Henje and Johnny Weissmuller are multiple champions of the Olympic arenas. The talents and perseverance of the two athletes will be confirmed and rewarded in consecutive editions for sporting reputation and subsequent affirmation as actors. The patterns created by their image have generated a new possibility of professional orientation: acting.

By exemplifying patterns and tendencies initiated by the world sports, a Romanian model that will ensure the perpetuation of sporting values is now taking root. Born in the interwar period, in an Olympic year (1932), the athlete Lia Manoliu will be the only ambassador who will receive the highest Olympic honors. We mention two of them: "The Olympic Order" and "The Centenary Trophy" awarded by I.O.C. Participating in six consecutive Olympic editions, she has achieved the stunning performance of being the Olympic champion at the age of 36. Having subsequently served as chairman of R.O.C. and senator in the Parliament of Romania will be crowned in 1974 with an "International fair-play trophy" awarded by U.N.E.S.C.O. in Paris (Matei, 1996). Due to the constant and fruitful work carried out by Lia Manoliu within the Executive Committee of the

European Association of National Olympic Committees (E.A.N.O.C.), she will be rewarded as an honorary member of E.A.N.O.C. (Vrabie et al., 2002). The sporting model fully launched by our athlete has succeeded in conquering the national and international Olympic family through the achieved sports performances, the moral values, the winning spirit, qualities that speak for themselves about the authentic Olympic ideal launched by the ancient Greeks. Is not by accident that we will find Lia Manoliu mentioned in the famous Guinness-Book publication (Matei, 1998). For our country it means a huge image gain, which many countries did not have. The fullness touched by Lia Manoliu evokes the famous words of Emerson: "What you are, sounding so loud in my ear, that I can not hear what you say to me" (Moț, 1998, p. 99). Regardless of the longevity and brightness of laurels accumulated in a sporting life, it must be taken into account that they are ephemeral, what remains is the human genetic background. The education gained during the sport life gives quality to the genetic heritage, so that a special sporting result will be often accompanied by an exemplary life. Sports medals always talk to us about the past, but the present shows the person who remains beyond these laurels.

Ion Matei's publication entitled "The Sport- Deity with 1000 faces" speaks of a supernatural power that sport provides through its practice, about the familiar or lesser known parts of sporting life, and the laurels achieved in a performance career with their reverse too. The examples and manner of their description are attributed to the hero ranked at a level of deity due to the psycho-social impact that it has on all people.

Year 1944 brings with it the celebration of half century of existence since the founding of I.O.C. (Meyer, 1960). The ongoing world war still far ahead to conclude, with increasing human and material losses, could not provide the time to celebrate events in the history of Olympism, which, once more, through the ancient tradition, presupposed peace, the cessation of any confrontation armed between the human communities of "city-states", confrontation through sport, acclaiming the victorious, who is superior by physical, psychic and moral qualities, including by the defeated.

Presidents I.O.C. who worked during the period 1940-1964 were: the Belgian Count Henri Baillet Latour (1925-1942), the Swedish J. Sigfrid Edstrom (1946-1952) and the American Avery Brundage (1952-1972) (Bucur Ionescu, 1975). As we see for four years the Olympic Movement did not have an officially appointed president to lead it. One reason that contributed to this hiatus in the Olympic Movement was the sudden death of Belgian President Latour. At that time Vice-President I.O.C. was the Swedish Edström who will take over the leading during the war until he will be formally elected at the Lausanne Session (1946).¹ What saved the Olympic spirit was "clandestine games" organized during the Second World War.

The participation of the Romanian delegations in the inter-war Olympics was reduced numerically, as medals too. However, the collaborative relationships of R.O.C. with other national committees mentioned during the 1948 Olympic Year, were sufficiently well represented numerically. We can recall the relations with the Olympic committees: Italian, Swiss, Californian, Indian, Brazilian and Spanish (C.N.E.F.S. Fund, file no. 12/1948, file no. 13/1948). Subsequently, other Olympic committees will be added to the collaborators list.

So, after the Second World War, the result of the presidential election at the leadership of I.O.C. nominated as the winner the Swedish Sigfrid Edström. His good diplomat skills will be highlighted in the fragile post-war context when he excludes Germany and Japan from the London Olympics (1948) and will start the Soviet Union's acceptance campaign in the Olympic family. On his withdrawal from office he will be appointed honorary president of I.O.C. until his death in 1964. ² He said he would hand over his post as president of I.O.C. to the one who will find "a

¹ www.olympic.org

² www.olympic.org

middle way between the rigid amateurism of the Anglo-Saxons and the "hidden professionalism" of the state-sponsored sports nations, implicitly a president who will "guide Olympism to reality." At that time, the struggle for the leadership of the international Olympic took place between Brundage from the United States and Burgley from England (C.N.E.F.S. Fund, file no. 49/1951-1952, f. 174). The election will decide the president in person of American Avery Brundage. He will know how to combine the sporting attributes listed by the former President of I.O.C. in a single unit without causing major repercussions on the two characteristics, apparently in contradiction: amateurism and professionalism.

Brundage's conviction was that sport should be apolitical, saying that "when you enter in the sanctuary of sport, leave politics at the door" (Alexeev, 1952, p. 13). His subsequent decisions on some issues raised in the Olympic Movement will prove that the image of sport, considered apolitical, will be attributed to new, more permissive nuances in this direction.

In May 1950, I.O.C. will launch a project regarding the reduction of the Olympic Games program, applicable after the Helsinki Olympics. The reference program will be the London Games edition, where no new sport is expected to be later accepted (C.N.E.F.S. Fund, file no. 93/ 1952).

On this ground in September 1952, the new president of I.O.C. Avery Brundage, sends a letter to all the National Olympic Committees and International Federations, in which proposes, among other things, the elimination of all team sports as well as feminine competitions from the Olympic Games. The invoked reasons are related to the prevention of the increasing number of participants in games, due mainly to the tendencies manifested by the athletes to obtain money at any price and to the increasingly violent competitive spirit. According to Brundage, all these characteristics will lead to an unpleasant end in which "the games will totally lose their raison of being" (C.N.E.F.S Fund, file no. 93/1952, f. 64-67). Suggestions porposed by the I.O.C president were rejected because they contradicted the universality and fairness of the Olympic ideals (Meyer, 1960).

Despite Romania's relations with a number of Olympic committees from other states, after the first post-war Olympics, the situation of physical education and sports at national level did not appear too optimistic. Evidence is also our lack of participation in the London edition. The future Romanian member in I.O.C, Alexandru Șiperco, expresses his dissatisfaction with the indifference of ministries regarding the place and role of physical culture in Romanian society. To improve this inconvenience, Șiperco calls for an approach to the subject of physical culture and sport at government level (C.N.E.F.S. Fund, file no. 28/1950). The purpose of the request was to inform and empower state-related structures to support the promotion and development of the field of physical exercise.

Since 1950, Șiperco become more and more aware of his presence through his daring proposals and interventions, which have a different viewpoint than that of the majority used to find in our archive documents (Chancellery Section Fund, file no. 81/1950). The members of the party will describe as "unhealthy" these manifestations of Alexandru Șiperco, vice-president of Committee of Physical Culture and Sport (C.C.F.S.), considered in contradiction with the Communist party's priorities related to the expansion of the relations with the Soviet Union (Chancellery Section Fund, file no. 143/1950, f. 2-4). We are at the full stage of class struggle, when the party and administration of the elements of the old bourgeois-interwar intergovernmental regime was the order of the day. Coming from a small bourgeois family, Șiperco was also classified as a competent and corect person, both politically and professionally, eager for continuous improvement, being called "the man who reads everywhere" (Propaganda and Agitation Fund, file no. 95/1950, f. 28). The characterizations made in favor of Șiperco prove to be sufficient and persuasive to counteract his "excesses" in attitudes manifested in certain circumstances, without mentioning disciplinary measures taken against him.

On international level, at the Helsinki Olympics, the Romanian Boxing Federation will designate the top three referees to represent our country in this competition. In the end, only two Romanian judges will be accepted, namely: Ion Gruia and Aurel Weintraub (C.N.E.F.S. Fund, file

no. 86/1950). The list of referees will be completed in the following editions with three other sports: gymnastics, fights, shooting (C.N.E.F.S. Fund, file no.345/1956). In Olympics held in 1952, the first foreign coach was called to train the national water polo team (Propaganda and Agitation Fund, file no. 6/1952). The exchange of international experience in sports training intensifies. The demands made by the national sports forums are oriented towards several countries, the priority being on Soviet Union (Propaganda and Agitation Fund, file no. 102/1953). The increasing number of foreign coaches in our country is due, on the one hand, to their sporting performances, but also to the financial expenses necessary for their employment, which are considered lower. From a financial point of view, it was more advantageous to hire a foreign coach than to invest in more players. An appropriately selected sporting group can bring results to the record of the Romanians without charging the record to other countries if they are running athletes in foreign teams. The sporting human capital selected from the mass of the Romanian people denotes confidence in its genetic qualities and a promotion of national sports values that will bring the desired international recognition.

In 1953, one year after the Helsinki Olympics, in our country were made prospective plans to evaluate as honorably as possible to the next Olympic Games (Propaganda and Agitation Fund, file no. 102/1953). Three years of sports training are considered insufficient for rigorous and efficient preparation, future proposals taking in account the four-year Olympic period. As a support for these revisions to Olympic preparation plans, it is the example of all countries applying such long-term periods, being considered the only way to ensure success in sports performance (C.N.E.F.S. Fund, file no. 366/1956).

The relationship between Romanian Republic and Soviet Union is increasingly strengthening in the field of sports. On the occasion of the organization of the World Youth Festival in Bucharest, is established a delegation consisting of the president and vice-president of the C.C.F.S. , who will go to Soviet Union. The two delegates, Manole Bodnăraș and Alexandru Șiperco, will consult each other, as a matter of priority, on the international sports links and the organizational steps related to the world festival. In the same year (1953), Șiperco is also scheduled to attend a I.O.C. meeting in Mexico (Propaganda and Agitation Fund, file no. 102/1953).

In the year preceding the Melbourne Olympics (1955), Alexandru Șiperco is chosen member of I.O.C. for Romania (Postolache, 1995).

With the preparation of the Australian edition, a series of measures will be taken regarding the development of the Romanian Olympic Movement. The first two major measures envisage: the reorganization of the R.O.C., which was no longer in line with the composition set at the previous Olympiad (1952), and the finding of a settlement for the R.O.C, distinct from that of the C.C.F.S., as the model of the other countries with popular democracy. Several objectives were also set out in the project: establishment of a permanent weekly rubric in the newspaper "Folk Sport" about the Olympic Games, editing of a trimestrial Romanian Olympic Bulletin, with translation in French, English and Russian, and editing of Olympic stamps (Propaganda and Agitation Fund, file no. 40/1956).

Other concrete situations regarding the desire to make time and sports training more effective are highlighted by the growing interest shown by R.O.C. regarding the study of the venues of the Olympic Games in Australia. The delegation of our Olympic Committee will be among the leaders of the countries moving on the Austral Continent to study the organizational conditions offered by the hosts regarding future games (C.N.E.F.S. Fund, file no. 365/1956), the climate, the time required to travel between sporting venues, acclimatization periods, etc. Traveling on the Australian continent brings a factor that should be taken into account in sports performance: large time zone differences. Time gap differences will require a new strategy of sports training: acclimatization. As a result, the stages of acclimatization will be scheduled to take place in the Olympics year, in Chinese Republic (C.N.E.F.S. Fund, file no. 350/1956).

Motivated by the first gold medal conquered in the previous Olympics, as well as by our country's socio-political impact on the international level through the conquest of this medal, the involvement of the state and the sports institutions will be more categorical. The lots of athletes who will represent us at the Olympics will be politically indoctrinated periodically by conferences and written materials on Marxist-Leninist ideology. The training is done by persons competent in propaganda (C.N.E.F.S. Fund, file no. 364/1956), the purpose is to inoculate to the athletes a behaviour as faithfully as possible of the principles of socialism. At the cultural and genetic level, Romanian athletes were considered inferior to those from the capitalist countries. The remedy of these factors should be done in a way that is more deontological in order to obtain the expected effects (C.N.E.F.S. Fund, file no. 355/1956). The best stimulant for athletes is given by granting monthly allowances that provide differentiated nutritional treatment on sports disciplines (C.N.E.F.S. Fund, file no. 357/1956), thus providing the caloric intake necessary to support the physical effort of performance. Other measures are provided by the removals from production and school frequency exemptions (C.N.E.F.S. Fund, file no. 356/1956) in order to ensure continuous and efficient training, all these steps being reflected in the changes made to all the state institutions who were linked to the day-to-day life of Olympic athletes.

Reports and statistics are starting to be drawn up with the chances of our athletes ranking first place in some Olympic disciplines. Last but not least, the accumulation of points for the final ranking of the participating countries is also targeted. The conclusion is that: through a larger participation, the possibilities of our country are growing, referring to its best position in the overall ranking of the Nations of the Olympic Games (C.N.E.F.S. Fund, file no. 366/1956). These facts denote a quantification of the image of Romanian sport on the international level, which begins to gain greater importance at national level in order to improve the image of our country and to develop its relations in the world.

Every Olympics tries every year to be brighter and to remain memorable in the mind and soul of the participants and the spectators through the various actions that are taken. The 1956 edition launch a new competitive spirit long before the competitions starts. The conclusion is that: the foundations of outstanding Olympic sport results have been settling long before the competition began (C.N.E.F.S. Fund, file no. 327/1956).

The attention paid to the details for the gifts offered by our delegation at the Olympics (C.N.E.F.S. Fund, file no. 355/1956) to the foreign delegations with which they came into contact, as well as to the presentation clothes at the official opening of the Games, the Olympic Games in Melbourne begin to play a major role in the image of Romanian sport (C.N.E.F.S. Fund, file No. 357/1956). The four-year Olympic training plan is being considered more and more. Accordingly, it is used to prepare training documents to reflect the sports performance at different stages of training (C.N.E.F.S. Fund, file no. 360/1956), while offering the possibility of prompt intervention in preparation, in situations where there are some inconsistencies with the established objectives. In addition to the determinants factors of performance (physical, technical and tactical), individual scores of athletes show the importance and effects of psychological factors (C.N.E.F.S. Fund, file no. 336/1956) in the sport effort. In equal sports value, the weight of mental training is essential in the effort and performance. Self-confidence, motivation, and persuasion of achieving a good result provide an advantage to the mentally trained athlete, against the least trained at this level.

There will be a first TV show on the national as well as worldwide. It is about the Olympic theme broadcast in Romania of the year 1960. Named "Olympic medals", the show presented a timeline of the Romanian results for the last two Olympic Games, Melbourne and Rome (Nobilescu, 1996). The event contributes significantly to increasing the possibilities of disseminating information from all corners of the world and from all fields of activity, including sports.

The establishment of the International Olympic Academy (I.O.A.) in 1961 meant a new opportunity to propagate the Olympic ideals in order to ensure the values they launched and

consecrated (Matei, 1985). At the I.O.A. sessions were highlighted by the Romanians paperworks: Alexandru Șiperco and Victor Bănciulescu (Tudor and Ludu, 1985). The Romanian Olympic Academy will be founded after three decades.

Starting with the Olympic Games held in Tokyo (1964) mass media sources begun to put more emphasis on the image of athletes and sport. The articles published in the press about the Olympics will be more suggestive through photos, highlighting the beauty of sport and sporting show (Sport, octombrie, 1964). The number of published Olympics articles is impressive. The publishing space allocated to the Olympic Games is held consistent throughout the Olympic Year, not just during the Olympics competitions (Sportul popular, 7 aprilie, 1964). The press is completed in information with radio and television, through which the Olympic edition can be watched and lived more intensely every day by the Romanian people (Sportul popular, 1 octombrie, 1964).

CONCLUSIONS

In the interwar period, important changes in Romanian physical education and sport were made predominantly during the years of Olympic Games such as: initiatives and approaches in education, the setting of objectives and the achievement of outstanding results etc.

The appreciation of the national and international personalities involved in the Olympic Movement is achieved by awarding sports distinctions. In 1954 members representing Africa and Asia in I.O.C. were in number of two for the black continent and ten for the eastern one (Propaganda and Agitation Fund, file no. 10/1962). Five years later, out of the 97 countries admitted to I.O.C., only half (50) were represented with members. Hungary, Romania, Poland and Switzerland had one member on the list of affiliates (Meyer, 1960).

The Melbourne Olympics (1956) brings to the foreground the results of our athletes and the competence of the Romanian referees present at the Olympic Games. In refereeing, there are noticed the following sporting branches: canoeing, boxing, gymnastics and shooting. With the Olympic gold medals won in this edition, Romania is among the top ten countries in the world from the nearly 70 participating nations.

The list of the Romanian Olympic medals conquered in four post-war olympic editions in which we participated as a nation, amounts at 39, number that succeeded in removing Romania from the anonymity of the countries participating in the Olympics. In comparison with the two medals (bronze and silver) conquered in a 12-year period – between Paris (1924) and Berlin (1936) - their number increased considerably in the 12 postwar years (1952-1964) (Propaganda and Agitation Fund, file no. 10/1962).

The 4-year Olympics training round remains for the Romanian sport a desideratum that is mentioned as an optimistic measure at each Olympiad but not yet applied with the necessary consistency (Propaganda and Agitation Fund, file.no. 54/1964). The Japanese edition introduces new sports into the Olympic sports disciplines, such as volleyball. This is a merit attributed to the R.O.C. which maintains its active involvement in the International Olympic Movement (Sports in Romania, 1990), that denotes the credibility given to our forum through the pertinent proposals made and achieved in the world sports.

In the decades of the 70- '80s the issue of explosive expansion of the Olympic phenomenon, through the newly accepted team sports (volleyball-1964, handball-1972), becomes a priority concern of I.O.C. in order to control Olympic gigantism phenomenon (Filaretos, 1998).

The longevity organization of the Olympic Games with their universality produce "something illustrative in the world. National energies, instead of opposing and fighting them selves, take place in parallel, and instead of destroying each other, they want to compete" (Bănciulescu, 1983, p. 100). Regardless of the time in which these Olympic competitions took place, indifferent to the political tensions they were subject and to their exposure to the phenomenon of gigantism that risks to interrupt their cursivity, or the interferences they have been

exposed over time, they have succeeded in convincing through their capacity to adapt to modern social trends; they have mobilized the world through the joy of supreme victory that they transmit at the time of its attainment; they have sensitized the society through the beauty of the sport show and the impressive efforts of the organizers showed from the edition to edition in the opening ceremonies; they have continued to reinvent themselves and take power when world conflicts have denigrated the existence of all mankind, but they have known to assumed the criticisms that may have spoiled them from the carefully constructed image. All this demonstrates that the Olympic ideal has found and finds resources to survive despite the obstacles encountered over time, the engine of this eager energy to perpetuate her self lies in the desire and the joy of competing, being among the best, but also in the unequaled feeling offered by the sports victory.

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THE TEMPORAL STRUCTURE OF THE GAME - A MODELING ASPECT IN PREPARING BASKETBALL TEAMS

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Abstract: In our country, the basketball activity at all levels fails to produce the long-awaited revival, as the results of internationally representative teams in recent years are modest. Children and junior domestic competitions are of a low quality, which is reflected in the quality of international performances. In seniors' competitions, the value level is higher due to the presence of many foreign players in the competition. Unfortunately, official regulations, which allow the presence of four foreign players on the court, drastically reduce the selection area for national batches of players. The quality of the training process, volume and intensity of training lie below the requirements of the international game model. In this context, raising the quality of training by increasing the coaches' professional level becomes a mandatory requirement. The use of modeling as a training method fits into this context of continuous improvement of the training process and responds to the requirements of increasing sports performance.

Key words: basketball, effort, model, modeling, duration of the game

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INTRODUCTION

The basketball game field is the object of studies and researches materialized in scientific analysis, based on objective data, the team's and the players' evolution, in a continuous improvement of training methodology and the generalization of the results of these researches through specialized articles and studies.

The game content, the complexity of the training results transfer in the players and the team's performance behavior, are continually improving due to the "players and coaches' creative ability who have adapted and made the most of the results of fundamental and applied research in the field of the most important exact sciences and humanities" resulting in the continuous improvement of basketball game training process (Ionescu and Dîrjan, 1997).

The analyzes made at the level of the Romanian Basketball Federation (F.R. Baschet - CCA, 2007) reveal that in terms of players' stature (height), we fit into the international model both as an average value per team as well as per position. It is all the more necessary to raise the coaches' professional level, to connect them to the field's novelties and to use them in the process of programming, planning and conducting the athletes' training. "Any improvement, any novelty in the advanced practice of the game or as a result of scientific research, entails investigations for the discovery of individual and collective antidote tactical and technical solutions, in order to find the appropriate means and methods for training and the appropriate technical-tactical and physical training" (Teodorescu, 1979).

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Jordane and Martin (1999) believe that a new conception of the game implies a new conception for "building up" the basketball training. It is necessary to review and rethink the training methodological milestones, determined by the new dimensions of the basketball effort distribution: the total duration of the game, the actual playing time, the percentage of effort periods and time outs, the number of consecutive team actions.

Many of the papers studied, tackle the problem of preparing the groups of children and juniors in basketball with particular emphasis on the technical-tactical aspect of training, without focusing enough on the need to apply modern methods for optimizing training at this level. There are few authors in the specialized literature studied who have offered approach strategies for training optimization through modeling. In modeling, almost identical drills regarding the motor and temporal movement structure of specific actions and the specific psycho-physical regime of the game are used, setting the movement parameters (power, speed, endurance, skill) that are to be developed. According to this principle, for each sports game, only those drills with direct and positive transfer to the game technique execution (Colibaba and Șufariu, 2005) will be used during physical training.

PURPOSE

The purpose of this paper is to provide young coaches and teachers with objective data on the duration of game actions, data established following high precision measurements. Consequently, we hope to come to their aid for a better approach to planning and scheduling training, in order to optimize the training and implicitly, increase the team's performance capacity.

MODELING IN THE BASKETBALL GAME

The current methodological guidance in sports games aims to bring the training effort closer to the physiological requirements of the game. The level of these requirements is reflected in the data provided by the specialized studies and by the collection, processing and interpretation of statistical data during the training and comparing them with those collected during the competition. The supporters of this methodological line in preparation assume that the training effort, especially for juniors, is below the level of the match and as such, it should be raised to higher physiological levels and appropriate to the specificity of the basketball game. This correction attitude, permanently adjusting to the "physical reality" on the basketball court, will be a determining factor for a constant progress (Feflea, 2011).

Modeling the training of young basketball players can be a valuable milestone in this approach, only in the context of linking to the current features and trends of international game development as well as aspects related to age, gender and athletes' training level. In the basketball game, the model is the expression of the highest possible use of players' ability in close dependence to the game-specific driving structures and which determines a certain effort particularity. Colibaba and Bota (1998), appreciates that the authentic modeling source is the actual game as practiced by the team, whose players can be classified into a certain age category with a certain level of training and performance capability.

In team sports, developing operational models is more difficult. A permanent review is needed to review drill system parameters to check the degree of correlation and take the necessary steps to optimize the model. The training method for athletes practicing in the basketball game must always take into account both the evolution of the game (the international game model) and the latest conquests of related sciences, in order to develop the most effective means and use the most impactful training methods on the objectives pursued.

Modeling as an operational tool may take the form of an operational model consisting of drills or drill systems having a decisive effect in increasing the performance capacity in the sporting industry for which they have been developed.

What can be subjected to the modeling action?

- effort characteristics (duration, intensity, complexity) and of time outs between two effort sequences;
- the characteristics of cooperation relationships between 2-3 players;
- the opponent's play characteristics (offence movements, defense systems, etc.);
- the environmental model (hall, hostile gallery, hall brightness);
- stress caused by hostile arbitration;
- practice modeling of certain game situations (game endings in which the team is led or is leading with very tight differences);
- the execution of technical elements (free throws, throws in the last second of game, etc.) on an increased background of psycho-physical strain and the examples can continue.

All these steps aim to improve the performance of the game (individual and team's), which leads to a continuous increase in performance.

TEMPORAL GAME STRUCTURE

Along with the basic structure of the basketball game, the temporal game structure is one of the major pillars in training modeling. Knowing the succession, duration, frequency, alternation, degree of complexity, and type of action specific to the game is an essential element in modeling basketball training. The features of the temporal structure derive from the very characteristics of the game: this is a 40-minute effort, divided into four quarters of 10 minutes of actual game with a 2 minute time out, between quarters 1 and 2, 3 and 4 and 15 min. between quarters 2 and 3. The effort can last for 90 minutes, including both periods of effort and multiple time outs during the game, which are critical for the characterization of the game.

On a predominantly aerobic strain, short, but high-intensity anaerobic strain (jumps, sudden speed-ups, defense actions, etc.) may occur. Shifting from one form to another is made according to the intensity and duration of successive actions (play sequences). Bosc and Grosgeorge (1994) show that while in the 40-minute actual time play (ATP) of basketball intense efforts are 21.27 min., in football, in 90 min. they represent 8.11 min, and at rugby they represent 8.39 min. of the total 80 minutes.

The rules of the game are one of the fundamental elements that in turn determine the formal and functional structure of the game. The rules impose some temporal limitations (24 sec. duration of an offense, 8 seconds for passing the ball into the offense court, 3 seconds for staying in the restricted area, etc.), which gives the game a fast pace, being a very spectacular game.

At the same time, the rules of the game provide the coach with the opportunity to restore players' ability to recover from increased fatigue. Making several changes (some of them tactical, others due to the accumulation of personal fouls), the coach can give players some time off, allowing them a partial time out, but enough to return to the game. Urbach (Bompa quote, 2003) shows that the actual time spent by a player on the court during a game and recorded as such on a timer, averages 26.3 minutes.

The percentage share of effort periods and time outs is, according to Colli and Faina (quoted by Colibaba and Șufariu, 2005):

Regarding the temporal structure of the modern basketball, game specialist research shows the following values:

- actual Playing Time (APT) is 40 minutes;
- the total duration of the game (TDG) is increasing (81 min.), the changes to the regulation (the introduction of the four 10-minute periods, related time outs, TOs, etc.) causing this increase;
- with regard to the ratio between the two parameters (APT/TDG, the video analysis revealed the following:

Table 1. The percentage share of effort periods and time outs
(Source: Colli and Faina, 1985)

Effort (sec)	%	Time out %
1 - 10	5.4	5.1
11 - 40	52.0	51.7
41 - 60	14	20.1
61 - 90	14.7	13.8
91 - 120	8.7	4.3
Over 120 seconds		2 - 3 times per game

Average action duration is, according to the same authors, the following:

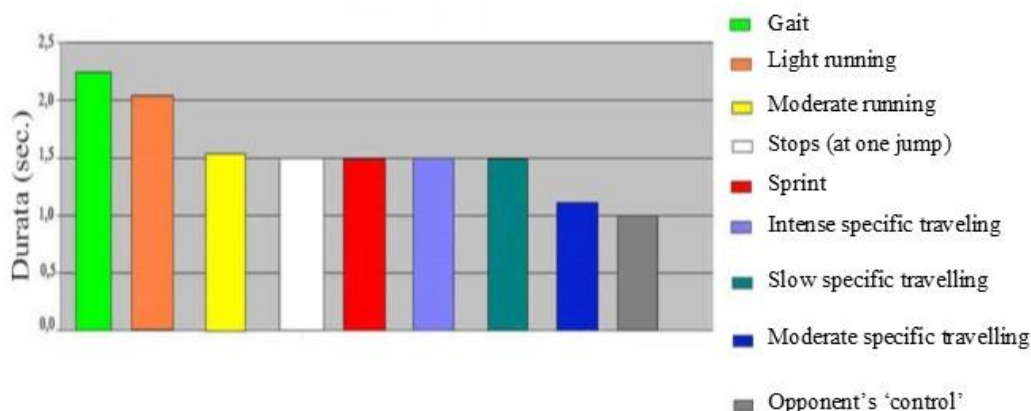


Figure 1. Average action duration during a game
(source: Travaillant and Cometti, 2003)

Game interruptions (under normal conditions) are:

- 20-30 sec. to execute a free throw (x 1, 2, 3, ... n free throws);
- 20 sec. for change (x 1, 2, 3, ... n changes);
- 11- 40 sec. for misconduct and foul;
- 60 sec. for each time-out requested;
- 2 min. time-outs between quarters 1-2 and 3-4;
- 15 minutes time out between rounds.

The number of interruptions and their total duration during a game is approx. 150 interruptions totalizing approx. 23-30 min. (without time outs between quarters and halves), according to data presented by Colli and Faina (1985).

Travaillant and Cometti (2005) accounted, following a video analysis for a number of 60 ± 10 **playing sequences**, with an average duration of 36 ± 2 sec, followed by interruptions with an average duration of 32 ± 4 sec. (excluding time outs between periods and rounds). This finding illustrates the intermittent nature of the activity and suggests an incomplete recovery. A game sequence corresponds to a succession of actions having the same intensity, its duration being equal to the sum of durations of each action (table 2).

Table 2. Evolution of the number and the average duration of game sequences and game stops
(Data sources: Travaillant and Cometti, 2003)

Period	Game Sequences		Game Stops	
	Number	Duration (sec.)	Number	Duration (sec.)
1	14 ± 2	40 ± 1	13 ± 2	29 ± 2
2	15 ± 4	33 ± 7	14 ± 4	31 ± 6
3	18 ± 3	35 ± 4	17 ± 3	30 ± 7
4	13 ± 8	42 ± 11	12 ± 8	42 ± 17
Total/ game	60 ± 10	36 ± 2	56 ± 10	32 ± 4

With regard to the number of **consecutive team actions** and their **average duration**, Jordane and Martin (1999) show the following:

Table 3. Number of consecutive team actions
(Data sources: Jordane and Martin, 1999)

Number of actions	No./ match	Average (sec)	Duration (s)	% of total time
1	16.33	19	310	13.0
2	10.33	34	350	14.0
3	7.00	49	343	14.4
4	5.33	58	307	12.9
5	5.00	85	425	17.8
6	2.33	90	207	8.7
7	4.00	110	444	18.4

Travaillant and Cometti (2003), have studied **the percentage distribution** of specific actions and actions not specific to the game, (table 4), reaching the following conclusions:

Table 4. Percentage distribution of non-specific actions of the game
(Data sources: Travaillant and Cometti, 2003)

Non-specific actions		% APT	%TDG
Low efforts (for recovery)	Stops	7.8	3.5
	Gait	24.8	11.0
Light efforts	Light running	10.0	4.4
Moderate efforts	Moderate running	6.0	2.7
Strong efforts	Sprints	2.7	1.2
Total		51.3	22.8

As a conclusion on these data, it results that 51,3% of the actual playing time (APT) there are performed actions that are not specific for the basketball game and 48,7% are specific actions, of which 42% specific movements and 6,7% dribble actions (of which 1% in high speed). Starting from data presented, we can deduce the guidelines in formulating training objectives. In reality, each team's playing style can influence these values.

Referring to the **frequency of actions** during the game, Colli R. and Faina M. (quoted by Colibaba and Șufariu, 2005) show the following values:

Table 5. Frequency of actions during the game
(Data sources: Colli and Faina, 1985)

Type of action	Quarterback	Forward	Centre
Ball defense	14.5 s *	13.0 s	7.5 s
Defense without ball	18.0 s *	11.2 s	14.5 s *
Defense of weak side	8.2 s	14.7 s	18.2 s *
Slow transition	11.7 s	13.0 s	3.5 s
Moderate speed passage	11.2 s	20.0 s *	17.0 s *
Quick transition	12.0 s	11.7 s	7.2 s
Jumps throws	5.5 s	4.7 s	2.2 s
Jumps following	1.2 s	3.2 s	5.7 s
1x1 without ball	11.0 s	9.5 s	5.2 s
1x1 with ball	3.0 s	4.7 s	2.5 s
Ball blocking	-	-	6.2 s
Criss Crosses	-	+	1.7 s
Stops	3.2 s	8.2 s	8.2 s

* the highest indicators

Research conducted by Colli and Faina (1985) on **distribution of efforts and time out** (table 6), shows that approximately 52% of the player's active time is concentrated in periods between 11 and 40 seconds (for example, intense defense 10-15 seconds, followed by a 20-24 second set offense). Actions that take longer than 1 minute, they represent 28.7% and are quite rare.

Table 6. Distribution of efforts and time outs
(Data sources: Colli and Faina, 1985)

Play			Time out	
Duration (sec.)	Frequency	Percentage (%)	Frequency	Percentage (%)
1-10	34	5.4	36	5.7
11-20	141	22.5	153	24.4
21-30	108	17.2	114	18.2
31-40	76	12.1	57	9.1
41-50	43	6.8	66	10.5
51-60	45	7.1	60	9.6
61-70	37	5.9	45	7.1
71-80	25	4.0	36	5.7

In the authors' opinion, there is a direct link between the duration of the action and the time out that follows. If the first increases, the duration of the time out also increases.

We notice the gradual decrease of percentages towards the end of the game, the return period being the main beneficiary of this trend. This phenomenon suggests fatigue and the need for a longer recovery period in order to continue with effective and high-intensity actions.

The different physiological strains mentioned above, allow, in Jordan and Martin (1999) opinion, a classification of a player's actions into four categories of effort, depending on the intensity and duration of the effort:

- very short actions (1-3 sec.), performed at maximum intensity (98-100%): 1-2 isolated dish actions, jumps, sudden stops, direction or pace changes, run and gun sudden movements;
- short actions (up to 10 seconds), with an intensity of 95-98%, corresponding to two or three consecutive actions (defense aid - panel recovery - fast break running, etc.);

- actions with a relatively short duration (less than 1 minute), carried out with a fairly important effort intensity (90-95%). They meet during some consecutive actions (at least four), such as: defense of the dribble shooter - steal (removing the ball from dribble) - fast break - fast return in defense. Statistical data shows that this type of actions is rare during a game;

- actions with a variable duration, conducted at medium intensity. Usually these are interposed between the actions of the first two categories during the same stages of play (e.g. transition from a fast break to a set offense).

During training lessons and also of micro-cycle, the coach, depending on the objectives pursued, must alternate the intensity of the effort and implicitly the energy channel, by using data from the temporal structure analysis of the game in order to determine the duration of the effort sequences and their consecutive time outs. This way of working requires a very good knowledge of the potential for each method used, of its degree of correlation with the physical, technical-tactical and psychic strain model, in accordance with the principle of standardization and rationalization of methods.

CONCLUSIONS

Along with knowledge regarding the nature of the effort, knowledge regarding the distribution of efforts and time outs during play is an essential condition in planning physical training specific to players. The modeling of the training structures used in training in terms of effort duration and the successive time outs gives the effort similar characteristics to a competition, creating the prerequisites for fulfilling the basic objective of children and juniors' training: setting the basic technique and tactics of the game under conditions of psycho-physical tension, specific to official competitions. Knowing the temporal characteristics (temporal structure) of the game increases the efficiency of drills used during training, generating both the optimization of the training and the increase of the performance capacity.

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CONTENTS

**HOW DO SPORTS COMPETITIONS HELP IN THE PROCESS OF
SOCIALIZATION OF STUDENTS (10-12 YEARS OLD)**

Ioan SOPA, Marcel POMOHACI, Dan Alexandru SZABO..... 5

**FENCING TRAINING EFFECT ON MUSCULOSKELETAL FITNESS
IN CHILDREN DIAGNOSED WITH ATTENTION DEFICIT
HYPERACTIVITY DISORDER**

Lydia HATUEL CZUCKERMANN, Iacob HANTIU.....18

**SOURCES OF INFORMATION, LOCATION AND REPUTATION OF
A UNIVERSITY CENTER – KEY FACTORS FOR DECISION-
MAKING TO BE TRAINED AS A PHYSICAL THERAPIST AT
"VASILE ALECSANDRI" UNIVERSITY OF BACAU**

Dan Iulian ALEXE, Gabriel MAREȘ, Daniela CRĂCIUN..... 30

**THE INFLUENCE OF SPORTS AND PHYSICAL ACTIVITY ON
THE METABOLIC SYNDROME: A SYSTEMATIC REVIEW**

Adriana BAIDOG, Grigore Vasile HERMAN..... 39

**RELATIONSHIPS BETWEEN R.O.C. AND I.O.C. AND THEIR
IMPACT ON THE ROMANIAN OLYMPIC SPORT (1920-1964)**

Alina Felicia SUCIU 46

**THE TEMPORAL STRUCTURE OF THE GAME - A MODELING
ASPECT IN PREPARING BASKETBALL TEAMS**

Ioan FEFLEA 56