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INDIVIDUAL TECHNICAL AND TACTICAL VALUES OF EFFECTIVENESS REGARDING THE TEAMS PARTICIPATING TO THE "JUNIOR I FINAL VOLLEYBALL TOURNAMENT", DEJ 2012

GĂTEJ MIRCEA[1], SANTA CRISTIAN[2], SZABO-ALEXI PAUL[3], SZABO-ALEXI MARIANA[4], SANTA ONELA[5]

ABSTRACT. The authors of this paper consider that an evaluation of Junior I teams is very useful due to the fact that youth male volleyball teams are not succeeding to qualify to any European tournament (excepting the years: 2006-2007 when the Romanian team won gold and bronze medal at B.G. -isolated results). By taking part and observing the "Junior I Final Volleyball Tournament" disputed in Dej, allowed them to gather data about the effectiveness of players in all the games played. The authors consider that the analysis and publication of recorded data might have a benefic impact over volleyball specialists that may assess and build long term strategies to the development of juvenile male volleyball after analyzing the recorded data, which finally will bring the long desired ranking as participants in the European Tournament.

Key words: Volleyball, Efficiency, Junior I Final Tournament

REZUMAT. Valori ale eficienței acțiunilor tehnico-tactice individuale ale echipelor participante la turneul final de juniori I –Dej-2012. Autorii acestei lucrări consideră că o radiografie a evaluării echipelor de juniori I este foarte utilă în contextul în care de ceva vreme voleiul masculin juvenil nu mai reuşeşte nici o calificare la vreun turneu final european (excepție face anul 2006-2007 când echipa României reuşeşte o medalie de aur şi una de bronz la J.B.-rezultate izolate). Participarea autorilor la turneul final de juniori I de la Dej, a permis acestora să să culeagă o serie date referitoare la eficiența jucătorilor în partidele disputate. Autorii consideră că analiza şi publicarea acestor date ar putea avea un caracter benefic pentru specialiştii din volei, care după analizarea lor să poată evalua nivelul la care se află voleiul masculin juvenil şi posibilitatea de construire a unor strategii pe termen mai lung, care în final să aducă mult râvnita poziție de participanți la turneul final european.

Cuvinte cheie: volei, eficiență, turneu final jun.I.

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Study premises

The processing and interpretation of official data collected on the spot during the five days of competition allows us to make a meaningful comparison, without giving solutions regarding the individual technical and tactical training of the participant teams and players within "Junior I Final Volleyball Tournament".

Subjects and Operating Approach

Efficiency data were collected with the "Click & Scout"[6] software - Data Project - Italy, Mircea Gătej, Cristian Santa.

Our approach followed the route registration, systematization, processing and interpretation of data regarding individual, technical and tactical efficiency of the "Junior I Final Volleyball Tournament":

- Technical and tactical effectiveness of individual actions: the serve kick, taking the ball up from serve, striking, blockage;
- Compare with the "International Average";
- The share of attack rendering on Phase I ;
- National level and excellence group player's efficiency reported to the other players' efficiency.(Serban,1999)

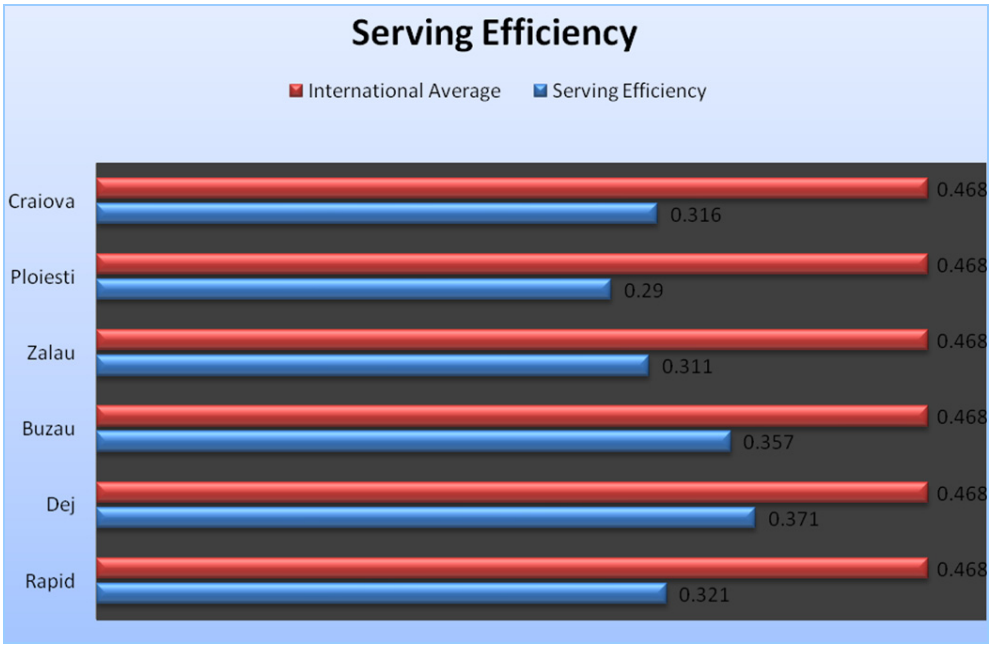
The subjects of this study are the 72 players from six teams participating in the "Junior I Final Volleyball Tournament" disputed in Dej, 2012, and their choice is justified by the fact that at least in theory these are the most powerful Romanian teams in 2012.
As working methods we used:

- ✓ Informatics registration method information;
- ✓ Interpretation of statistical and mathematical method;
- ✓ Plotting method.

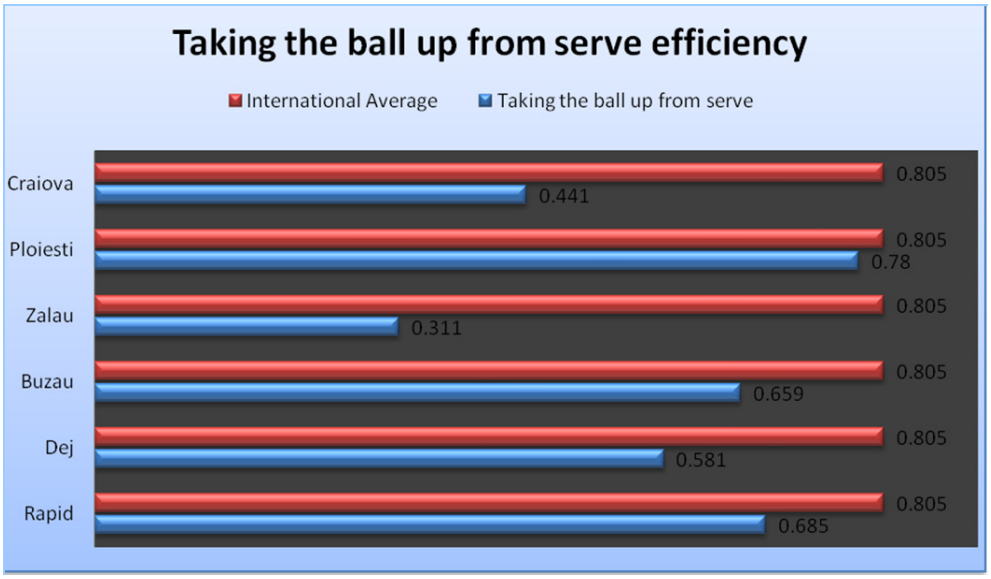
Table 1. Game efficiency Values

Nr.	TEAMS	GAME EFFICIENCY	RANKINGS	EFFICIENCY STANDING
1	Lyc. 12 CFRBucureşti	0,530	I	I
2	LAPI Dej	0,495	II	III
3	CSS Buzau	0,476	III	V
4	CSS Zalau	0,516	IV	II
5	CNMV Ploieşti	0,490	V	IV
6	LNT Craiova	0,420	VI	VI

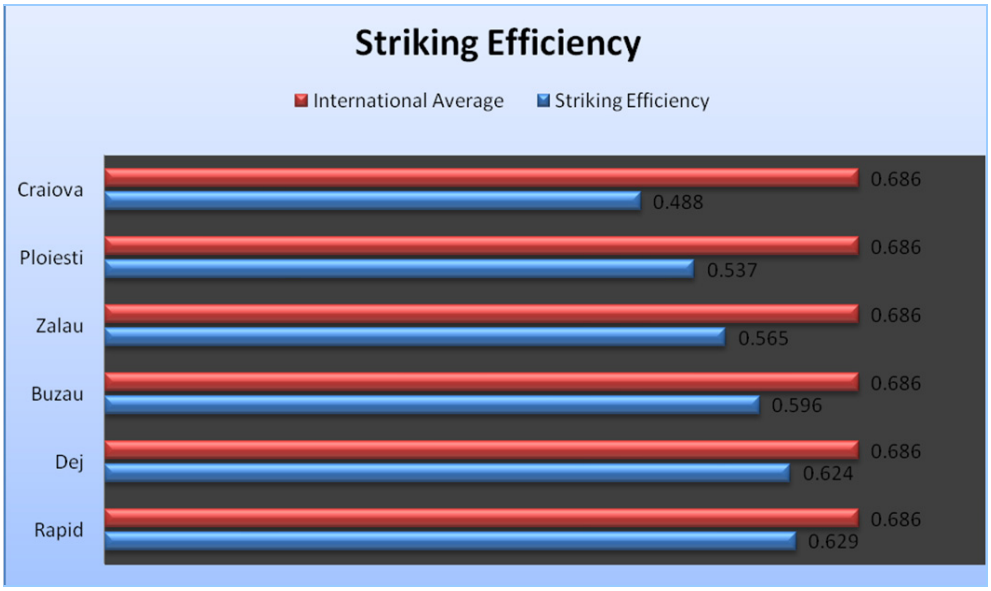
[6] Licensed to: Gatej Mircea



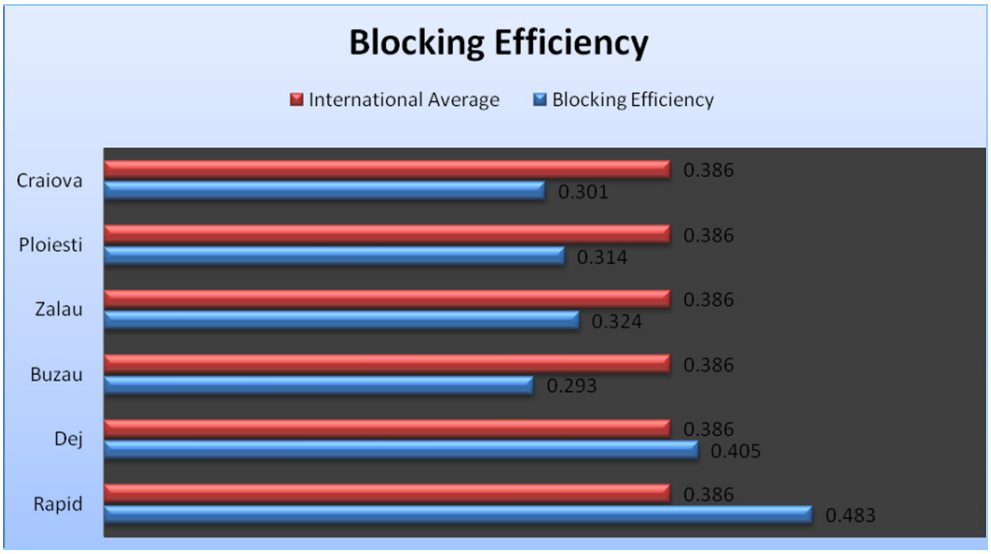
Graphic 1. Example of serve efficiency compared with the international average



Graphic 2. Example of taking the ball up from serve efficiency compared with the international average



Graphic 3. Example of striking efficiency compared with the international average



Graphic 4. Example of blocking efficiency compared with the international average

Results approach

A. From Table No.1 we can note that Rapid Bucharest team has finished first and has the best game efficiency. The other teams excepting Craiova do not have the game efficiency standing similar to the one occupied in the final rankings. This result is due to either a training based on jumps, meaning that some individual technical and tactical actions were being prepared more efficient, or due to a floating evolution in this particular tournament.
B. From Chart No.1 results that all participating teams are well below the international average, but still, the teams from Dej and Buzau have higher values.
C. Chart No.2 shows a rather poor value of taking the ball up from serve. Effective in this technique is the team from Ploiesti is close to international average followed by Rapid team. The other four teams have a very low efficiency regarding this technique which makes us believe that its training method is problematic to the junior teams.
D. Analyzing Chart No.3 with striking efficiency example reveals a quasi-linear decrease of striking efficiency starting from the team ranked first Rapid team and quickly decreases to the last ranked team Craiova. Rapid has the striking efficiency values close to the international media, followed closely by the team from Dej. These are the teams with the largest number of athletes in the national team.
E. Chart No.4 blocking efficiency example follows almost the same pattern as Chart No.4 the decrease from the team ranked first to last ranked place. The first two teams have the blocking efficiency over the international average, and the other teams are well below this value. The negative exception is the team from Buzau ranked third which has the lowest efficiency in blocking. Perhaps this is due to low height average of the team and the lack of any player summoned to the national team.

Instead of conclusions

- The efficiency level of the four individual technical and tactical actions is generally below the international values (apart from the blocking and attacking recorded on both Rapid and Dej teams);
- The teams in Buzau, Zalau, Ploiesti, Craiova have recorded high differences in efficiency values of the four individual technical and tactical actions compared to the international standards;
- Both Rapid and Dej teams have high values and balanced individual technical and tactical effectiveness;

- Both Rapid and Dej are training under the LPS system, 18 hours per week of training as opposed to others that have a lower volume of training on CSS system.
- The two teams (Rapid and Dej) are composed by the majority of national volleyball athletes being trained in the national centers of excellence in volleyball.

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THE RELATIONSHIP BETWEEN CONTENT AND FORM IN COMMUNICATION AND THE ROLE OF WATER IN THE TRANSMISSION OF INFORMATION

GROSU EMILIA FLORINA[1], GROSU VLAD TEODOR[2], PETREHUŞ DENISA[3], CUCEU DOINA[4], MIHAIU COSTINEL[5], MURESAN IOAN[6]

ABSTRACT. Communication is one of the basic requirements in any type of activity. Modern science claims that water structure in every human body is identical to a water structure in which the human was born. In this study we intend to investigate and to certain which is the proportion of the "component factors determining good communication in sports, to increase sports performance" (Winneck, Y.,1995, p.125). "It is known that the effect of good communication in a team leads to a to strengthening one and this effect is based on the individualization of communication over each person using specific techniques, thereby achieving maximum results with minimum effort possible"(Grosu, E., F., 2009, p. 372). I used the term of "pentacomunication", this term beeing entered and recorded in the literature since 2006 by Massimo Piovano to clearly delineate the components of communication. The globality of pentacommunication is highlighted by the following five dimensions: understanding, clarity, kindness, courage and conscience". „Pentacomunication's test" was performed and recorded by Massimo Piavano in 2006, and we have applied it on several groups of athletes: artistic gymnastics, dance, aerobics and fitness, rhythmic gymnastics, figure skating.

Keywords: Water, comunication, pentacomunication, relationship's axis, content's axis, code, individualization, message.

REZUMAT. Relaţia conţinut şi formă în comunicare şi rolul apei în transmiterea informaţiei. Comunicarea este una dintre condiţiile de bază în orice tip de activitate. Ştiinţa modernă susţine că structura apei din corpul fiecărei fiinţe umane este identică cu structura apei în care s-a născut aceasta.În acest studiu noi ne-am propus să cercetăm şi să constatăm care este proporţia dintre "componentele factorilor care determină o bună comunicare în sport în vederea creşterii performanţelor sportive" (Winneck, Y.,1995, p.125). "Este ştiut faptul că efectul unei bune comunicări într-o echipă duce la o

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consolidare a acesteia, iar acest efect este bazat pe individualizarea comunicării asupra fiecărei persoane în parte prin folosirea tehnicilor specifice, obținând astfel rezultate maxime cu un efort minim posibil"(Grosu, E., F., 2009, p. 372) Am apelat la termenul de "pentacomunicare", acest termen fiind introdus şi înregistrat în literatura de specialitate începând din anul 2006 de către Massimo Piovano, pentru a delimita clar componenetele comunicării. Globalitatea pentacomunicării este pusă în evidență prin următoarele cinci dimensiuni: *înțelegerea, claritatea, amabilitatea, curajul şi conştiința*. "Testul pentacomu nicării " a fost realizat şi înregistrat de către Massimo Piovano în anul 2006, iar noi l-am aplicat pe mai multe loturi de sportivi: gimnastică artistică, dans, gimnastică aerobică şi fitness, gimnastică ritmică, patinaj artistic.

Cuvinte cheie: apă, comunicare, pentcomunicare, axa relației, axa conținutului, cod, individualizare, mesaj.

The role of water in communication and information transmission

Earth is a giant water tank where there were born all life forms,and every living thing is itself almost a water tank. With the help from technology we can go far away into the space, and as we seek to discover life on other planets first thing we are looking for is water. There is no life on earth without water. The universe exists as a unique and perfect body. All its parts, including us and the Earth, are are inseparably linked by information giant rivers. Water on our planet plays a key role in exchanging information. In fact it is the medium through which all nature is governed.

Despite the abundance of water on the planet, only less than 1% is fresh available water. This reserve was virtually unchanged throughout human history, even though population has increased steadily. Mankind has never seen as many people as there are today on the planet - 6.5. billion. But even now there is enough freshwater for everyone if there if there were no dramatic civilization attack.

"One of the biggest questions, in the event that there is similar life, to that on Earth, on other planets, is whether it is based on the presence of water. There are strong opinions that the first living organisms appeared in the water, and only much later these bodies have developed so that they can live out of water. I think this is not a coincidence." (Kurt Wurtrich, 2008), Ph.D. Prizewinner Nobell Switzerland – USA.

Modern science claims that water structure in every human body is the same water structure in which he was born. So our inner connection with our birth place is maintained throughout life. And this means that the concept of home has not only an elevated poetic content but also a physically content very specific. Depending on the age, a human being is made up of water. In a percentage of 70 to 90%. An adult drinks about 2.5 liters of water every day, to sustain normal life functions. Another liter and half is absorbed through the skin when we bath or shower.

"In me and you.that we are present here, there is water, and this water contains many types of information and if this water is injected into a human body, the information contained will combine with that person, and this could change that person's character. Let's see how this type of water affects human blood. The doctor takes blood from a patient'sfinger.Using a special microscope, he will be able to see her body condition by studying the drops".(Emoto Masaru, 2008), Japan Researcher.

The red blood cells that have lost their electrical charge. They are crowded in a band called roll. Here's a huge simplast. „The simplasts are associated with heart diseases, arthritis and lung diseases, along many other unhealthy conditions that may occur in the future". The doctor asks the patient to drink a small amount of structered water. After 12 minutes, the doctor takes the patient's blood again and studies it. You can see that the cells became buoyant, slippery and now have electrically charged so that they repel each other. „This allows them to carry oxygen and this means that blood pH changes in a specific one, for an aerobic environment and not for an aerobic one. I believe that is quite extraordinary that only drinking water may have such an effect". (Perl Laberla, 2008), Immunologist Medicine Doctor.

Traditional Chinese medicine was based, for many centuries, on vibrations and resonance of the water content of a body. Pulse indicates if the resonant tone is correct. It is believed that the pulse may be strong, weak, cold or hot. On this basis an experienced doctor performed a kind of energy body scan, diagnoses and prescribes a treatment.

"Water has a very important photo memory, we could say, and water can also be impregnated with extremely subtle energies, even ten miles away." (Rustum Roy, 2009), Prof of the Pennsylvania State University, member of the International Academy of Science USA. Is it this way that distance communication between human beeings is realized, human beeings being the essentially structeres based on water?

In February 2005, Professor Vyacheslav Zvonnikov and a group of colleagues conducted an experiment to confirm or refute the hypothesis that sustaines the possibility of remote communication between human beings. Two people are at 15,000 km away from each other. One in Moscow and the other one in the north of South America near the town of Santa Elena. Here you can see the virtual brains of the participants in experiments. During the 15 minutes before experiments there are no visible correlations. There are registred the tinests changes of pulse position or frequency of respiration. There are registred the electro-cardiograms (ECG) and electro-encephalogram (EEG). Suddenly, the instruments record visible changes. The two men, separated by this enormous distance, were somehow on the same wavelength. Instruments show the timing of their areas of the brain, the breathing and the pulse ones. How can we explain this? "We still don't have any answers to this question. So far this is a mystery of science. It is a hypothesis that says that body fluids have a role in all this. Most probably, and we have evidence of this - is that the body fluids realize a kind of information transfer function." (Vyacheslav Zvonnikov, 2005).

"When you look at organs, eg heart, lung, muscle or brain, all that you can see is water in these organs. Water, your head is filled with water",(Kurt Wurtrich, 2009), Ph.D. Prizewinner Nobell Switzerland – USA. There is almost nothing but water.

"A big part of our brain is water so that a smooth movement of water molecules will leave an imprint. So, water is indeed, to some extent, involved in structuring information in the brain."(Rustum Roy, 2009), Prof of the Pennsylvania State University, member of the International Academy of Science USA.

"We have shown that the brain is made of water, by approximately 85%, so that these changes happen in the brain. If the water we consume is not enoght, conflict occurs between water structures. The brain'sBioplasma is disrupted, and the result is that the humanbeing lacks even basic will tolive."(Victor Inyushin, 2009), Doctor of Science Professor, Head of Biophysics, University Department of Kazakhstan.

Taking into consideration a functional aspect, the nervous system is a network of interconnected neurons, similar to the structure of a computer, because both have an input system, a system processing them and a system that displays the results. The connection between neurons is accomplished through synapses. They are specialized structural formations, which are between presynaptic neuron axon and the dendrites or cell body of the postsynaptic neuron. The interneuron connection is made between between the presynaptic, represented by the axon's terminal button ant the postsynaptic segment, represented by a small area of the postsynaptic neuron membrane on which is applied the terminal button. The two synaptic segments are separated by a synaptic space. "So the connection between neurons is not a direct contact, but is chemical mediated, by realising the mediator in the synaptic gap."(Dan Mirela, 2006, p.45) "The transmission of nerve impulses from the motor nerve endings to the muscle fibers is made through a similar formation called the motor plate (neuromuscular synapse), having as a mediator the acetylcholine.

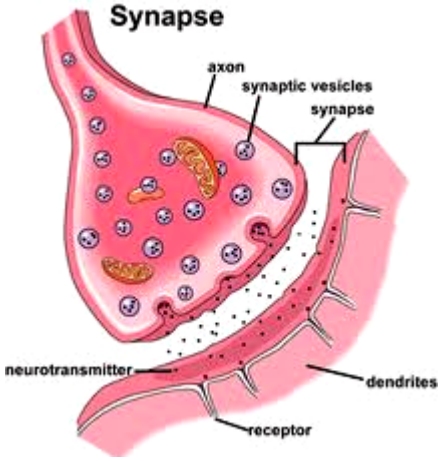

Fig. 1. –Synaptic Vesicles
https://www.google.com/search?q=synaptic vesicles

Neurotransmitters are chemicals released from presynaptic nerve terminals and which are attached to specific sinuses receivers on postsynaptic neurons. So far, there have been identified at least 30 potential or active neurotransmitters. A potential neurotransmitter partially meet the criteria of a neurotransmitter. Neurons are able to synthesize a number of neurotransmitters, even during early embryological development; as the continuous development takes place, most neurons specialize in producing a single neurotransmitter (Dale's principle of neural specificity). This theory remains valid for many years, but recent research has revealed some mature neurons able to produce two, occasionally three types of neurotransmitters. For most neurons, the neurotransmitters bind to specific receptors and influence the membrane's potential. (Elena Zamora, 2002) There are also more complex mechanisms involving the ionic channels and the emergence of late effects.

"**Water has memory**," Experiments performed in many countries around the world have shown that water receives and records all outside influence, remembering everything that happens in the space surrounding it. „The phenomenon of structural memory allows water to record everything that happens around it, and to connect together all living systems. Each of us is a link in the endless chain of information transmission. But, in addition, each of us is also a source of information". "If this process were to continue indefinitely, water would could turn out crazy. But it is endowed with a capacity for self-purification. This occurs when the transition between phases, when it evaporates and then condenses and falls as rain, or when it freezes and then melts. Shaking off informational dirt, the water keeps the basic structure: to sustain life" (Vladimir Vobkov, 2008). Each of our actions, thoughts, emotion, a spoken word separates from us and becomes part of the globally energy-informational environment.

Any substance that comes in contact with water leaves its mark on the structure. As water records new informations, it acquires new qualities. However, its chemical composition remains unchanged. The old theory emphasizes the importance of water chemistry. „Water structure is more important than chemical composition. Water structure is given on how its molecules are organized. We can see water molecules gathered together to form groups". (Rustum Roy, 2009) - "These are called clusters (molecular groups). Scientists have forwarded the idea that these clusters (molecular groups) function as memory cells, of a certain type, in which water records the whole history of its interactions with the world, likely to a tape." People do not think that when you turn on the light, water changes. When we open the electric field of the voltage wires, water may change. So this is the research. "Modern tools allowed us to record that in each of the memory water cells there are 440,000 information units, each being responsible for their own way of interaction with the environment. "Of course, the water remains water (its composition is always H_2O, but its structure changes, such as the nervous system reacts to any change).

"The ocean is still able to erase this memory because of its salinity, however the dilution effect is present" (Victor Inyushin). It's ought to be also discussed and studied that at very high dilution memory begins to influence sometimes even stronger than at low levels, when the concentration is higher.

"If we consider a cluster as a specific group of molecules, it can survive only for a short time, but if we consider that there is a structure from which some of molecules leave and others come in, cluster can remain effective for a very long time". (Martin Chaplin, 2008), Chief Laboratory Professor of London University Great Britain. Stable cluster structures confirms that water is able to record and store information.

Neurotransmitter properties

Recent progresses in identifying neurotransmitters and related molecules have reoriented the interneurons relation's conception. It appears, in this way, a chemical neuro-anatomy that no longer meets the traditional neuro-anatomy.

The scientists should look more closely at how water interacts with it's own molecules. At the molecular level, it creates the DNA structure – without water we would not have the DNA helix. Also, the water creates the structure of proteins. So, our bodies would not work without water. "Each seed, each embryo begins its life exclusively in water. Amniotic fluid plays an important role in embryo development and conservation. The surrounding water is the one that, like a auniversal computer, reveals any biological program and also the water is the only thing that can change the program" (Martin Chaplin, 2008).

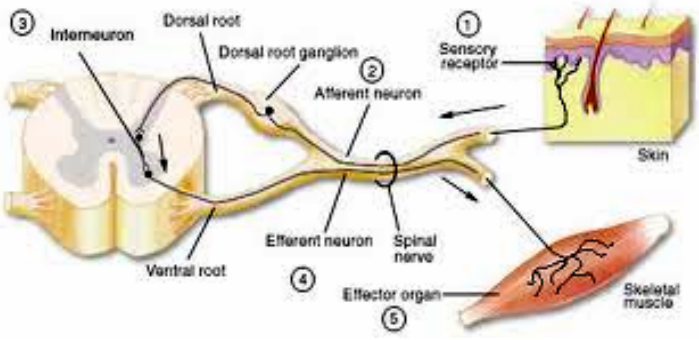

Fig. 2. – Reflex arc
https://www.google.com/search?q=reflex+arc

Form of communication: the fact that water is the basis of all phenomena and life components, made us decide that the second part of this research will deal with the basics of communication and form elements. Out of these we will define, taking into consideration Piovano Massimo's (2006) theory of pentacomunication and the components of this theory. The basis of good communication is a good link between the issuer – the one who is responsible for forwarding, who produces, encodes and forwards the message and the recipient – the one who sents the message, that, in order to be performed, has to be decoded (meaning to understand it). To achieve a good

communication we have to know that each recipient has its peculiarities, his way of thinking and his requirements. If we don't consider all these criteria it will result in a misusage communication without the results we expect.

The **message** is composed information of elements structured according to certain rules, of one or more codes transmitted by certain predetermined mean and channel. „**The code** ensures a coherent structure of the message, based on conventional rules, allowing the production and interpretation of the message. All languages are examples of codes" (Piovano,M. 2008). Encoding and decoding process is one in which the transmitter turns the idea into a message by choosing a code composed of signs; this message passes through the channel after it is received by the recipient. The recipient must transform the message ("translating" the code) into a concept that has meaning.

Communication takes place in a **context**, in a certain known situation or suspected to be known which partially approaches the issuer and the recipient. The mean, by which the communication is set, consists of a channel that is an instrument or a physical device (phone, for example) that we can use to activate, maintain, transmit and receive the message (Epuran M.,1996). It is very necessary, in order to see that information was understood, to have a feedback or response, which indicates the receiver reaction to the issuer's communication. In the world of inter-personal communication there are constant feedbacks. These can be divided into two categories: voluntary and involuntary,depending on the degree of awareness shown by the subjects involved in communication. In addition, feedbacks can be verbal (expressed with words) or nonverbal (expressed by tone of voice,body movements and / or facial expressions). „Each feedback, whether voluntary or involuntary, verbal or nonverbal, signals pressure, joy or refusal to the caller and the subject treated" (Piovano, M., 2007).

Methodology: Communication is done most effectively by following five dimensions, as (Piovano, M., 2008) shows: consciousness - which is the interference of the four dimensions: (comprehension) understanding through the gate's heart, courage through the boldness gate, courtesy through the meeting gate and clarity through the mind gate.

Table 1. The dimensions of communication

Elements of communication	„Answer to the question?"
Issuer	„Who's communicating?"
Recipient	„To whom we communicate?"
Message	„What's communicated?"
Code	„In which way are we communicating? (ex. italian, english, french etc.)"; „What form? (ex. Written, vizuală, hearing etc.)"
Channel	„means by which we communicate? (ex. TV, radio, internet etc.)"
Context	„what is the communication environment?"; „under what conditions?"; „what time was the message circulated?"; „in what social or existential context?"
Feedback	„the reaction the recipient may have regarding the sent message?"

Another important aspect of communication is the one about the pentacomunication axes. Pentacomunication is generated by the intersection of two axes and of two fundamental dimensions. For example: We are in a gym practice with students, and the teacher addresses young inexperienced girl, in a kind way: "See lady, it is important to beat kindly on the trampoline and once with both feet." In another trampoline, into another room, the teacher reacts the other way: "If you always knock wrong on a trampoline you will destroy it in an instant!"

In the both communication forms the content is similar. It changes very much the „relatind to" aspect. Certainly the first student will continue training with serenity and motivation, while the second will have some more difficulties, unless somehow she decides to change group or teacher. For this reason, do not forget to transfer information with the right tone. As said (Piovano, M.,2008), quoting George Bernard Shaw "with the right tone you can say anything. With a wrong tone, nothing, the only problem is finding the right tone. "

Participants

60 subjects, including 50 practitioners of the sport, and the other 10 people who do not practice any motrice activity, aged between 16 and 22 years, from Cluj-Napoca and Zalau, have reached the following results, as can be seen below.

Working tool: Pentacomunication's test, by (Piovano M.,2008). The instrument includes 40 questions that are grouped in 4 groups, that give clues about the vertical positive "+" and negative "-" axis, and the horizontal positive "+" and negative "-" axis.

Relationship axis corresponds to the vertical axis of the model, given by the conjunction of "comprehension" and "courtesy", which indicates the relationship aspect. Relationship messages are: instructions, indications, orders / requests for the recipient on what to do with the given information. On the relationship axis we receive information relating to "soft, flexible" part of the communication, defined by the following elements: the right hemisphere, pathos, emotions, feelings, metaphors, examples, pictures, poetry, music, aesthetics, nonverbal language.

Content axis corresponds to the horizontal axis of the model, given by the combination of "clarity" and "courage"; this represents the content. Content messages are the following: knowledge, information, data, object. There is no relationship without content and no content without relationship, which shows that, although there may exist separately, there is a close interdependence between them - "communication not only transmits information but at the same time requirea a certain behavior " On content axis we receive information relating to the "hard" communication, defined by the following elements: the left hemisphere, logos, reasoning, numbers, samples, tables, graphics, quotations, math, words. (Watzlaick,P., Beavin, J.H., & Jackson, D., D.,1971)

Questions specific to each axis can be viewed below.

Instructions: Answer spontaneously to each statement from below, marking clearly the number chosen. Assessments are: [0] = never, [1] = sometimes, [2] = often, [3] = always

Not to change the results you should give a response to each statement. Just try to define your most frequently behavior.

Procedure

The first step of the adaptation methodology for the Romanian population in pentacomunication test consisted in a translation in Italian. This was done in parallel, by two experts - a psychologist with expertise in Italian language and a translator. The psychologist was called because there are certain terms, with a shade slightly different from the usual vocabulary, which shall retain the purposes of the original instrument. The two versions were confronted and another team of specialists was called, two psychologists who chose for each item the translation that reflects best its original meaning. In a later stage, the questionnaire was submitted to a retranslation to compare the translation with the original. This was done by another person, not involved in earlier stages and it was provided as a means of checking the degree to which the original meaning of items was preserved. From this comparison there were found minimal variation, due to this they went to the next step, namely instrument pre-testing.

Pre-test's procedure of the instrument consisted of applying the questionnaire to a small sample of people, application accompanied by an interview.What interested us, was the response time on each item, verbal responses (questions) or nonverbal, to find the items that were problems in understanding. Besides the items that have aroused suspicion, I asked each subject to describes the problems encountered on the filing of the questionnaire. Most times there have been cases of misunderstanding of the meaning of words used, or othertimes some concepts without echo in the experience of subjects. Following this investigation were made minor changes in the wording of certain survey items. The final version came in a pilot study to obtain a first assessment of the success of the adaptation process and the psychometric qualities of the test, in the Romanian version.

Results

Responses to questions were grouped into the following four categories, reflecting the test's author's requirements and theiy were sumed.

To get a clear representation of our communication qualities, we must score in the diagram, on opposite page, given that

- **Dial 1** (- / -) indicates that your score resulted negative for both dimensions;
- **Dial 2** (- / +) show that you have a positive score on axis content / "male" size, and the negative on networking axis / "feminine" size;
- **Dial 3** (+ / +) indicates that you totaled a positive score on both axes;
- **Dial 4** (+ / -) indicates that your score is positive on the networking axis / "feminine" size and negative on the content axis / size "male".

Applying this test on a total of 60 subjects, aged between 16 and 22 years, practitioners of the sport (see on the vertical sport practiced), 50 persons and 10 persons involved in no motrice activity, we reached the following results:

Table 2. The subjects participate and communication qualities

Dial	Dance	Artistic Gymnastics	Fitness	Rhythmic gymnastics	Figure skating	Unsportsmanlike	Indications
C1 (- /-)	8/6 =1,3	14/7 = 2	12/12 =1	11/10 =1,1	13/11 =1,18	5/21 =0,23	Work on both sizes
C2 (-/ +)	8/17 =0,47	14/21 = 0,66	12/14 =0,85	11/25 =0,44	13/23 =0,56	5/16 =0,31	Work on relationship aspect, of ,,feminine size
C3 (+/+)	17/20 =0,85	21/20 =1,05	14/17 =0,82	25/28 =0,89	25/28 =0,89	16/17 =0,94	Good score for both axis, as each value gets closer to 30
C4 (+/-)	20/6 =3,33	20/7 =2,85	17/12 =1,41	28/10 =2,8	28/10 =2,8	17/21 = 0,80	Work on content aspect, of ,,male" size

In the table there were passed the arithmetic averages, on each component, to make a comparison between different quadrants – on the relationship or the content appearance. The data analysis shows the following:

Quadrant 1 (- / -): all results are positive, which means that there are no problems with communication. The group with the lowest level, which is closest to 0, is the group of the unsportsmanlike; this dial shows some difficulties in communication, integration and spontaneity. ,,You're probably a shy person and you don't always know how to remark yourself, because you don't trust yourself" (Piovano, M., 2008) These people, says , have to change pessimistic and fatalistic attitude and assume a mental attitude more confident and positive, about themselves and to others.

Quadrant 2 (- / +): subjects tend to favor the horizontal axis (the content aspect / communication's "masculine" size). The author suggests that, to complete communicative qualities, is important that concerned persons to be concentrated on networking (vertical axis of the model), where a negative score. In our case the lowest score was recorded in dance group and unsportsmanlike, groups that

should work more on how to express what is intended to be communicated.

Quadrant 3 (+ / +) has a good result, considering that the maximum score obtainable is 30 on both axes / dimensions. If the result is more oriented to the vertical

axis ("feminine" dimension / networking axis) the author suggests to "improve your communication asserting, the tendency to dare"(Piovano.M., 2008); Other areas of improvement - greater clarity and a more concrete approach of the situations to be solved. If, for example, your score would show a major predisposition to the horizontal axis ("male" dimension / focus content), it is important that those subjects commit to improving the quality of listening. Secondly, they should choose more carefully interpersonal relationships because success depends on people coming into contact. If you give attention to the sensitivity and respect size, the situation will improve. Outcomes are fairly uniform. We can notice the rhythmic gymnastics figure and skating group by very high values, close to 30.

Quadrant 4 (+ / -) subjects are stronger on the vertical axis (relational aspect / communication's "feminine" dimension). The author (Piovano M., 2008) indicates the following to improve your over formation, we advise you to immediately begin work on the horizontal axis ("male" dimension / content aspect). In order to understand the points where we have to work on, one must check if there were granted values [0], because those are matters over which should be reflected. Conversely, if the negative scores were assigned values [3], „these will be the elements for which you have to focus to improve your communication" (Piovano, M., 2008). If the vertical axis scores will be decreased (-) from the vertical axis scores (+) and the scores obtained for the horizontal axis (-) from the horizontal axis scores (+) and we get them in the table below, we get the following results.

Table 3. Vertical and horizontal axis in communication

Axis	Dance	Artistic Gymnastics	Fitness	Rhythmic gymnastics	Figure skating	Unsportsmanlike
Vert.axis(+) Vert.axis(-)	+11	+7	+2	+14	+10	+11
Horiz. axis (+) - Horiz. axis (-)	+14	+13	+5	+18	+15	-4

Conclusions

Relationship axis: by relationship aspect is understood the way how content of the message is communicated. Answers to the questions: "How to communicate what it needs to be submitted?" or "How we were told the message?"

Content axis by content aspect we mean the object of the communications. Answers to the questions: "What is communicated?" or "What we were told?" There is no relationship without content and no content without relationship, which shows that although there may be separate, it exists a close interdependence between them"the communication, not only transmits information, but at the same time, it requires a behavior", (Watzlaick P., Beavin J.H., Jackson D.D., 1971). Sometimes the relate

message itself is more important than the one of the content, so much so, not so much the object on which the interlocutors are expressed is important, but how they are put in relation to each other through communication. The data analysis shows the following: the more the values are closer to 30, the less we have to work on one vertical components: understanding and courtesy (relationship aspect) or the horizontal components: clarity and courage (appearance content). The negative values on the horizontal axis shows that in these groups we put too much emphasis on communication content and too little on the form. Nowadays the form has become an important part of the communication. The more the values are bigger and closer to 30 we have even less work on language form and more on content.

Therefore, before any communication, think through the suggested questions, on each element of communication. If you do not do this preventive analysis there are great chances to hit interference or disturbances, and the communication may be affected. The whole of the Pentacommunication is highlighted by the following five dimensions: understanding, clarity, kindness, courage and conscience, components that must be taken into account in any situation.

Rabby Israel: "everything begins in the water. In a certain sense we can say that all rooted in water and also in the water they end" (Adin Steinsaltz, 2008),

Many of Masaru Emoto's experiments, which have tried to find the words that purifies the water strongly, indicated that it is not just one, but a combination of two words: love and gratitude.

The universe was created by ABSOLUT, by the source that produced the whole existence and all its physical manifestations. We all have within us a part of the primordial ocean water. Every of our words are like drops of water. An environment of thought, a source of information, and we all need to reward the ABSOLUTE with love and gratitude!

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EMOTIONAL INTELLIGENCE DEVELOPMENT, GROWTH PERFORMANCE PREMISE

NUŢ RAMONA ANCUŢA[1]

ABSTRACT. Emotional intelligence related to emotional self-awareness, mastery of these emotions (by controlling the causes of generators) internal motivation to perform, coupled with initiative, optimism and dedication, empathy (the ability to understand emotions and feelings of others) and, not least, social skills, is the ability to establish positive relationships, to cooperate and collaborate with others to resolve conflicts, to capture attention. The theme is treated influence emotional development of performance. We speak of educability, developing emotional intelligence in both children and adults. Its development during the school will provide students, at maturity, a greater chance to adapt to the ever increasing demands of society. A child who fails at school will be considered broken and reacts accordingly. Through exercises and games to develop emotional intelligence students have the opportunity to critique and improve thinking skills and thus to optimize the feeling of self-efficacy, through which their vocational route itself and its stability will be clear.

Keywords: emotional intelligence, emotions

REZUMAT. Dezvoltarea inteligenţei emoţionale – premisă a creşterii performanţei. Inteligenţa emoţională ţine de conştientizarea propriilor emoţii, stăpânirea acestor emoţii (prin controlarea cauzelor generatoare), motivaţia interioară de a evolua, dublată de iniţiativă, optimism şi dăruire, empatie (capacitatea de a înţelege emoţiile şi sentimentele altora) şi, nu în ultimul rând, de aptitudinile sociale, adică de capacitatea de a stabili relaţii pozitive, de a coopera şi colabora cu ceilalţi, de a rezolva conflicte, de a capta atenţia. Tema tratată reprezintă influenţa dezvoltării emoţionale asupra performanţei. Putem vorbi de educabilitate, dezvoltare, în cadrul inteligenţei emoţionale atât la copii cât şi la adulţi. Dezvoltarea acesteia pe perioada şcolarităţii le va acorda elevilor, la maturitate, o şansă mai mare de a se adapta la cerinţele mereu crescânde ale societăţii. Un copil care nu reuşeşte la şcoala se va considera înfrânt şi reacţionează ca atare. Prin exerciţii şi jocuri de dezvoltare a inteligenţei emoţionale elevii au şansa de a-şi îmbunătăţi abilităţile de gândire critică şi, implicit, de a-şi optimiza sentimentul de autoeficacitate, graţie căruia însuşi traseul lor vocaţional şi stabilitatea acestuia se va limpezi.

Cuvinte cheie: inteligenţa emoţională, emoţii

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Education based on emotional intelligence is an approach in terms of calculations. Methods detailed, step by step can look good on paper it sounds appealing when we hear authors and experts talk about them. But these methods rarely in school. Like most things that give meaning to our lives and bring us satisfaction, education is extremely complex and profound. Education based on emotional intelligence stems from the fact that all our actions allow us to create a healthy balance in school and relationships with students. Our actions must emphasize the importance of feelings and helps us keep our emotions under control, rather than act impulsively or leave us feeling overwhelmed. For some children, life is hard and uncertain, for others, is full of tension. In both cases, losing control can mean the loss of rights, loss of extracurricular activities or tutoring. Children need a positive environment that offers many opportunities. Education based on emotional intelligence stems from the fact that all our actions allow us to create a healthy balance in relations with children by emphasizing the importance of feelings and emotions control.

Emotional intelligence related to emotional self-awareness, mastery of these emotions (by controlling the causes of generators) internal motivation to perform, coupled with initiative, optimism and dedication, empathy (the ability to understand emotions and feelings of others) and, not least, social skills, is the ability to establish positive relationships, to cooperate and collaborate with others to resolve conflicts, to capture attention.

The ability to recognize and cope with emotions lead to higher performance at school, at work and in relationships.

In an effort to overcome this apparent paradox researchers have introduced several new terms: social intelligence, practical, emotional intelligence.

What is emotional intelligence?

Emotional intelligence refers to skills whereby an individual can discriminate and monitor own and others emotions and the ability to use information available to guide their own thinking and action (Salovey & Mayer, 1990). Another definition, more recent, was given by Daniel Goleman (1995). According to him, means emotional intelligence and self-control capacity of stress and negative emotions, a meta-ability, which determines and influence how and how effectively we can use other skills and abilities that we possess, including educational intelligence.

Why children need emotional intelligence?

We speak of educability, developing emotional intelligence in both children and adults. Its development during the school will provide students, at maturity, a greater chance to adapt to the ever increasing demands of society. A child who fails at school will be considered defeated and reacts accordingly. Through exercises and games to develop emotional intelligence students the chance to improve their critical thinking skills and thus to optimize the feeling of self-efficacy, through which their vocational route itself and its stability will be clear.

Children need emotional intelligence:

- To succeed in life;
- To trust them in their skills;
- To know better and to know and others;
- To transform negative emotions, to know to occur safely when they feel angry, upset, worried, tired and sad.

Key skills of emotional intelligence are:

1. Self knowledge, one's own emotions: introspection, association and recognition after generating a sense of;

2. Managing emotions - the ability to deal with unpleasant emotions after we accepted that we feel. "I'm busy with an activity that makes me feel good."

3. Intrinsic motivation: channeling and control of emotions and feelings to an end, suppress impulses and delaying gratifications and rewards abandonment;

4 Establishment and management human relations: refers to the competence and social skills (knowledge, analysis and control of emotions of others);

5. Empathy: the ability to show sensitivity and concern for the feelings of others;

Indices of a high or low emotional intelligence

Signs of a high level of IE

A person with a high level of IE:

- Clearly and directly express their feelings using phrases that start with: "I feel ...";
- Not afraid to express their feelings;
- Is not dominated by negative emotions such as fear, worry, shame, embarrassment, disappointment, hopelessness, powerlessness, dependency, victimization, deterrence;
- Is able to distinguish non-verbal elements of communication;
- Allow feelings to lead to elections "healthy" and happiness;
- Counterbalance feelings with reason, logic and reality;
- Acts of desire, not the sense of duty, guilt, power or duty;
- Is independent, confident in their strength and has a strong moral;
- Is intrinsically motivated;- Is not motivated by power, wealth, position, fame, or approval;
- Is for the most optimistic but also realistic, and can also be pessimistic when appropriate;
- Not internalize failures;
- Take into account the feelings of those around him;
- Speaks nonchalantly about feelings;
- Do not lock in case of fear or concern;
- Is able to identify multiple concurrent feelings.

Signs of a low level of IE

A person with a low level of IE:

- Does not assume responsibility for their own feelings but blames others for them;
- Has difficulty formulating sentences that begin with "I feel ...";
- Cannot say why he feels a certain way, or cannot say no to blame someone else;
- Attack, blame, control, critical interrupts lectures, gives tips on the left and right value judgments about others;
- Try to analyze, for example, when you express your feelings;
- Often starts sentences with "I think you ...";
- Blames others;
- Hiding information or lying about their feelings;
- Exaggerate or minimize their feelings;
- Lacks integrity and sense of conscience;
- Bears hatred, pardon;
- Do not you ever say where you stand in relation to it;
- Felt uncomfortable "her around";
- Act on feelings rather than talking about them;
- Is indirect and evasive;
- Is insensitive to the feelings of others;
- No empathy, no compassion feels;
- Is rigid, inflexible, clear rules needed to feel safe;
- Is a person "cool";
- Does not think the feelings of others before acting;
- Act without thinking about future feelings;
- Avoid responsibility by phrases like: "What was I to do? I had no choice!"
- May be too pessimistic, leading to destruction of those around good mood;
- May be overly optimistic to the point it becomes impractical, denying the fundamental concerns of others;
- Allow "carried away" despite common sense, or give away the first sign of trouble;
- Be stubborn in their ideas, was too uncertain to be open to new opinions;
- Focus on facts rather than on feelings. (Adapted from: "EQ for everybody" by Steve Hein, 1996)

Several methods for the development of emotional skills

1. MANHANT

Objective: To understand that everyone has something unique

Procedure: Children will go on an expedition to "hunt people" to learn about their colleagues. It will walk through the classroom, observing colleagues and I discovered that having the characteristics written on the board. Will return to place, following discussions will write a name next to each feature.

Teacher's task: Help children understand that being different does not make us better or worse, just unique.

2. POSTER WITH PEOPLE

Objective: To learn that people have many different qualities and characteristics.

Procedure: Each student will receive a "poster people". Will have to draw pictures to illustrate some of what they particularly for 15 minutes. In the end everyone will share what they drew colleagues.

Teacher's task: people account for different qualities and changing and we can identify only a single quality.

3. I CAN DO, I CAN NOT DO

Objective: To learn that people have both weaknesses and areas that is highly competent

Procedure: Teacher explains to students that there are areas where people are doing and areas where people fail. Read from the board various activities, students have the obligation to rise when they hear something the can. Note the names of those who are standing questions following discussions with customization.

Teacher's task: It is important to emphasize that each has strengths and weaknesses and it's only natural that we do things.

4. EXPRES YOURSELF

Objective: To understand that it is better to express emotions

Procedure: The writing on the board a number of emotions to remind students. They are distributing paper bags and paper strips. You must write on the paper a sense that they felt did not tell anyone that emotion write and introduce strip in the bag. And the emotions they felt that they did not write them hidden outside pocket (positive emotions). Finally to give examples of emotions that keeps them for. Her examples of emotions those others share.

Teacher's task: to emphasize the negative effects that may occur when emotions are internalized. It is better to externalize emotions.

Conclusion

The educational system has traditionally put emphasis on three fundamental activities - writing, reading - all characteristic of the left hemisphere (dominated by rationality), excluding about education that is based right brain faculties of imagination, spatial orientation, decoding music, color, rhythm, creativity (dominant to the intuition).

Because these children do not have emotional problems in the future, the school must always find new ways, new methods and resources to develop capacity, in particular emotional intelligence - the most valuable purchase you can always rely in the future.

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FOUNDATION AND LEGALIZATION OF SPORTS CLUBS IN PORTUGAL

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ABSTRACT. In Portugal, as elsewhere in Europe's history and founding of the club is associated with high classes. This article seeks to present the evolution of associations in our country that began with the monarchy, where the first sport club founded has occurred in April 30 of 1856. Latter, in a period as a Republican, associations and clubs were subjugated to a fascist regime and dictatorial that lasted over 45 years, and ended with the revolution of April 25, 1974, when Portugal returned to democracy.

Keywords: history of sport clubs, legalization, foundation of sports clubs.

Foundation of sporting clubs in Portugal

The first club established in Portugal, the "Real Associação Naval" in 1865, devoted itself to the water sports, rowing and sailing. Crespo (1978), has five distinct phases in the founding of clubs in Portugal. They are: 1) Until 1933 - the clubs are founded in a spontaneous manner, without state intervention, representing the volume of a slow awakening of associations; 2) 1933-1945 - corresponds to the start of the fundamental economic, social and political state of the government know as "Estado Novo" where we must analyze in light of Decree No. 32241 of September 5, 1942 and No. 32946 of August 3, 1943, which requires clubs to submit to minister authorization. This fact causes that many clubs just are recognize later; 3) 1945 to 1968 - is a period of rapid economic growth, capital accumulation, industrialization and the expansion of capitalist relations. In the meantime, with the exception of year 1950 where there is a stronger movement of associative activity, we are also faced a negligible number of clubs in the foundation (Sousa, 1986). The fact that there are several barriers to association, among other things that passed through the analysis of political trends of the management bodies for further authorization for the foundation of clubs, largely inhibited the willingness of association; 4) from 1968 to 1974 - the turn of the ideological system, which however has no influence on the founding of sporting associations, having even

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the year 1972 as a reference for not having no club officially founded: 5) 1974 to 1978 - is the period of democratization of Portuguese society, with the revolution of 25th April 1974. During this period, there has been an unparalleled increase in the founding of new clubs (Crespo, 1978).

In order to make a serious study about this issue of sport clubs foundation, it should be noted four aspects: 1) Name of the clubs; 2) Date of foundation; 3) Nature of the foundation; 4) Associated members. About the first part, chooses eleven indicators on which it focuses and clears the percentage referred to: city (37.94%); sports (18.36%); modality (17.02%); another club (4%); another community (3%); fusion or continuation (2.01%); recreation (6.57%); cultural (4.16%); foreign (4%); triumphalism (1.74%); and group specific (1.74%).

As we can see, there are only three significant predictors: city (37.94%), sports (18.36%) and modality (17.02%). The fact that the indicator sports is able to join the indicator modality, since these two are closely related, which would give a score of 35.38%. In the second part of the founding date, shows the flows of the foundation, for decades, where we can check that: Very few clubs with origin before the year 1900; there is a steady rise until 1939; 1900 to 1909 (0.63%); 1910 to 1919 (3.45%); 1920 to 1929 (7.21%); 1930 to 1939 (12.54%); reduction in the interval from 1940 to 1949 (9.72%); increase the range 1950 to 1959 (15.05%); decreased in the range from 1960 to 1969 (13.48%); and large increase in the range from 1970 to 1979 (33,23%).

In the third part, nature foundation, found the following result: original initiative (86.14%) and merger or continuation (13.86%).

In the fourth part, founders, the study seeks to verify the relationship that exists between the founding members of clubs, verifies the following: friends (48.08%); practitioner in a certain modality (20.91%); neighborhood (13.7%); workplace (8.65%); school (4.33%); and other (4.33%). It also seeks to know the size of the group of founders and reaches the following conclusion: From 7 to 12 elements is the largest group (39.24%); 25 to 30 and more than 30 elements are the smallest groups, with (6.33% and 11.81%) respectively, while the remaining groups balanced between the preceding paragraphs.

It was also referred to the sex of the founders, concluding that while the man is present in every club in the act of foundation, the woman is a very small number.

This study is very important for their quality and confirms the previous study by Crespo (1978), namely the flow of the foundation. The fact that these studies confirm this line of evolution with regard to the founding of the club, can somehow counteract a reading of official data, which will precisely point the years 40 of the XX century, specifically the first half of this decade, such as greater flow of this phenomenon (Cullen, 2009; Sardinha, 2011). As regards Pires (1987; pp. 12), "all clubs had to make new laws, according to what was determined in the aforementioned decree, since the old statutes were prepared to a new order that would establish. The result was very simple: all the clubs came into existence (for the Directorate General of Physical Education, Sport and School Health) only since 1943. Before 1943 there were no clubs".

The legalization of sports clubs in Portugal

The September 5, 1942, was published in Government Gazette, the Decree-Law No. 32:241 of the Ministry of National Education (1942), in its Article 7 abolishes the Directorate - General of School Health, and creates the General Directorate of Physical Education , Sports and School Health, saying: "It is with this Decree-Law essentially aimed at creating a body of state who is to guide and promote outside of the Portuguese Youth Organization, of the physical education of the Portuguese people and introduce discipline in sports". Further it adds: "The new Directorate – General has a great mission. Is authorized to take any steps in the chapter on physical education; know intervening, directly or through their delegates, in sports organizations, all that is happening within these".

Thus, setting tasks for the Directorate - General. In article 7, number 1 provides that: "Caring, outside schools, the national organization "Portuguese Youth" and the "National Endowment for the Joy at Work", the physical education of the Portuguese people, directly and through public or private institutions set up with this goal as principal or accessory, directing and overseeing their activities".

Later in number 8, reads: "Intervene in the selection of persons who exercise or sporting competitions, there are to perform management functions or techniques, or have decision making powers." In 1943, August 3, is Decree-Law No. 32: 946 of the Ministry of Education (1943) that regulates and defines the powers of the previous Decree Law and Article 4 in relation to powers of inspectors of sports. Number 8 provides: "Attend the meetings of the general meetings, congresses, directorates, commissions, technical advice and administrative, sporting bodies or other acts of their life, whenever this is deemed appropriate".

Claims to be the constitution of any sports organization dependent on authorization from the Ministry of National Education: The requirements that apply if the permit required by this article shall be accompanied by the following documentation: i) Draft Statute; ii) Draft rules of procedure when there; iii) A list of previous affiliations and memberships already obtained and pitches, classrooms and equipment already obtained or in the process of being made.

In number 3 of that article requires that all organisms existing on the date of publication of this decree should submit, within a period of 90 days to the Ministry of National Education the process for approval.

He even, in the chapter of the organization, find out the ability to restrict people from being eligible, provided a minimum age limit up to the full enjoyment of civil and political rights.

How easily can be seen, these barriers are inhibiting the association. This is linked to the launch of the fundamental economic, social and political from the "Estado Novo". It is precisely in the forties that reverse the increasing trend in the flow of the foundation of clubs, which had been observed since the beginning.

Conclusions

The April 25, 1974 changed the previous scenario, making life easier for clubs regarding their legalization, seen as early as November 7, to be published Decree-Law 594/74 which regulates the right to free association.

Indeed in the preamble of this Decree-Law says: "In the ongoing democratic process, we must abolish the requirement for administrative permits that shaped the free formation of associations and their normal development". The right to set becomes a free and legal personality is acquired by mere act of filing status.

Thus in Article 4, number 1 states: "The associations acquire legal personality by filing, against receipt, a copy of the act of constitution and statutes in the civil government in the area of its address, after previous publication in the government daily and one of the most widely read daily newspapers in the region".

On the other side ends the permit requirement for citizens to associate. In Article 1, number 1 of the Decree Law states: "To all citizens over 18 years in the enjoyment of their civil rights are guaranteed the free exercise of the right to associate for purposes not contrary to law or morality public without prior authorization".

Later, on January 13, 1990, is published Law No. 1 / 90, the Law on the Sports System, as it makes life even easier for clubs with regard to its legalization, the force also clubs to comply with the Civil Code as it defines them as legal persons and are thus subject to Articles 157 to 184 of that code MEN (1990).

Says in number 1 of Article 168 of the Civil Code: "The document establishing the association, bylaws and amendments thereto shall be included in the public act". Having mentioned, in article 158, number 1: "The associations formed by public act... have legal personality".

The legalization of clubs, as can be seen, only began to be mandatory after 1942, so we only can have entries after this date.

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COMPLEMENTARY METHOD IN TEACHING DIDACTICS OF PHYSICAL EDUCATION: TRANSFORMING THE CARD GAME "PICTUREKA" INTO TEACHING GAME "DIDACTIREKA"

VĂIDĂHĂZAN REMUS-CRISTIAN[1], PRODEA COSMIN IOAN[1]

ABSTRACT. In search of effective methods of teaching, teachers experience continually. An important aid it gives, of course, by the theoretical content of pedagogy, being based on years of experience. Effective methods of working with students can be born from the outside school environment. We offer in this article an example to improve practice in education, an example inspired from a passion for board games. Such games are used to pursue a pleasant socializing day away from the computer when you meet your friends. I have learned, not long ago, about an interesting card game, a dynamic action game. It is called Pictureka! (Hasbro Europe, 2010). One of the four possible applications of game (8-Away version) gave us the idea of starting a teaching card game called Didactireka. For the teaching game of cards we gathered specific learning tasks for didactics of physical education. This led to a total of 20 missions. We wanted for these missions to have a medium degree of difficulty not to discourage students. We also considered that the tasks chosen have to cover a wide range of specific content from our domain. To have a better dynamic for the game we built each task card with two missions. Because some tasks have more words in the name, while others have few words, we decided to hook up tasks depending on length of text field. This modality of coupling the missions gives a good chance to all players, including those who have cards only for the second mission. We built on the cards. Also for the game to have a good dynamic and more than one entry in each round of play, we chose for each card game three components. The components were mixed together to get each card game components from different missions.We got 20 cards with missions and 40 playing cards. Dividing by 8 cards per player (or team players), the maximum number of players (or teams of players) is 5.

Key words: teaching game, physical education, didactic, card game, pictureka.

REZUMAT. Metodă complementară în predarea Didacticii EFS: transformarea jocului de cărți „Pictureka" în joc didactic „Didactireka". În căutarea metodelor eficiente de pedagogie practică cadrele didactice experimentează continuu. Un ajutor important îl oferă, desigur, fundamentarea teoretică a domeniului, bazată fiind pe experiența anilor trecuți. Metode eficiente de lucru cu studenții se pot naşte şi din afara

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sferei şcolare. Un astfel de exemplu de îmbunătățire a practicii în educație vă oferim prin acest articol al cărui conținut s-a dezvoltat datorită unei pasiuni legate de 'board games' („jocurile de masă”). Astfel de jocuri sunt folosite la întâlnirile cu prietenii când se urmăreşte o socializare plăcută, departe de calculator. Am dat, cu puțin timp în urmă, peste un joc de cărți interesant, un joc cu acțiune dinamică. El se numeşte Pictureka! (Hasbro Europe, 2010). Una dintre cele patru variante de aplicare a jocului (varianta 8-Away) a constituit ideea de plecare a unui joc didactic de cărți pe care l-am denumit Didactireka. Pentru jocul didactic de cărți s-au adunat mai multe misiuni din conținuturile învățării specifice Didacticii educației fizice. Astfel am ajuns la un număr de 20 de misiuni. S-a avut în vedere ca misiunile alese să acopere o plajă cât mai largă din conținuturile specifice domeniului. Pentru a avea o dinamică mai bună a jocului am construit fiecare carte de misiune cu câte două astfel de misiuni. Deoarece unele misiuni au mai multe cuvinte în denumire, iar altele sunt foarte scurte, am decis să cuplăm misiunile în funcție de lungimea câmpului de text. Această modalitate de cuplare a misiunilor acordă şanse mari şi jucătorilor care au pe cărțile lor răspuns doar pentru a doua misiune. Mai departe am construit cărțile de joc. Tot pentru ca jocul să aibă o dinamică bună şi mai multe variante posibile la fiecare tură de joc, am ales pentru fiecare carte de joc câte trei componente. Componentele au fost amestecate între ele pentru a ajunge pe fiecare carte de joc componente din diferite misiuni.Am obținut 20 de cărți de misiune şi 40 de cărți de joc. Împărțind câte 8 cărți pentru fiecare jucător (echipă de jucători), numărul maxim de jucători (echipe de jucători) este, astfel, de 5.

Cuvinte cheie: joc didactic, educație fizică, didactică, joc de cărți, pictureka.

In search of effective methods of teaching, teachers experience continually. An important aid it gives, of course, by the theoretical content of pedagogy, being based on years of experience.

Effective methods of working with students can be born from the outside school environment. We offer in this article an example to improve practice in education, an example inspired from a passion for board games. Such games are used to pursue a pleasant socializing day away from the computer when you meet your friends.

I have learned, not long ago, about an interesting card game, a dynamic action game. It is called Pictureka! (Hasbro Europe, 2010). One of the four possible applications of game (8-Away version) gave us the idea of starting a teaching card game called Didactireka.

We begin by presenting briefly the game Pictureka! after which we'll present, in detail, how was born and how to play Didactireka, a teaching card game designed for teaching the didactic of physical education.

The card game Pictureka! contains 78 illustrated cards (including 3 cards with penguin) and 32 double mission cards (those with indications). Brief description of the variant 8-Away: "A crazy race for all players!" (Hasbro Europe, 2010).

The rules for 8-Away model

The purpose of the game

To get rid of all 8 playing cards by finding missions for them. The first player who remains with zero cards wins.

Preparation

• Mix the mission cards (see Fig. 1) and put the package in the middle, face down.

• Mix the illustrated cards (see Fig. 2) and divide with face down 8 cards for every player.

• Players turn their cards face up, placing them on two rows of four in front of them.

How to play

1. Turn face up a mission card, read aloud both missions and then put the card face up next to the package.
2. Everyone (including you) look for the first four cards an illustration that matches any of the two missions. You cannot look for a picture on a card from the bottom line only after you get rid of a card from the top row.
3. If you find an illustration that fits one mission you must put the illustrated card on top of the mission card and you have to say Pictureka! You must explain what fits with the mission.
4. If other players agree, you managed to get rid the illustrated card. If not, take it back and seek in further missions until someone gets rid of a card.
5. The player who got rid of a card will read the next mission card and the play continues.

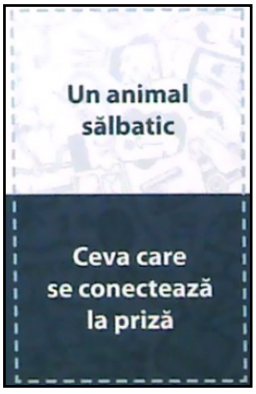

Fig. 1. Pictureka! card with missions

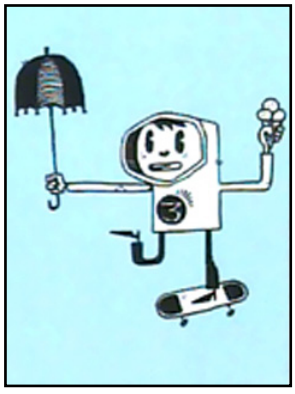

Fig. 2. Pictureka! illustrated card

For the teaching game of cards we gathered specific learning tasks for didactics of physical education. This led to a total of 20 missions. We wanted for these missions to have a medium degree of difficulty not to discourage students. We also considered that the tasks chosen have to cover a wide range of specific content from our domain.

The missions chosen are shown in Table No. 1.

Table 1. The missions for teaching game Didactireka

No.	Mission
1.	Motor quality
2.	Causes that can lead to poor density
3.	Component of the curriculum
4.	Components of pedagogical density
5.	Classification criteria of physical education lessons
6.	Evaluation criteria
7.	Basic motor skill
8.	Sport's motor skill
9.	Practical-utility motor skill
10.	Planning document
11.	Organizing elements of the physical activities
12.	Phases of evaluation
13.	Work formation
14.	Name of a children game
15.	Teaching material
16.	Way of interpretation of fatigue at children
17.	Primary objective for physical education
18.	Parameter of effort
19.	Sport
20.	Part of a lesson

To have a better dynamic for the game we built each task card with two missions. Because some tasks have more words in the name, while others have few words, we decided to hook up tasks depending on length of text field (table no. 2). This modality of coupling the missions gives a good chance to all players, including those who have cards only for the second mission. We measured the length of descriptions in Romanian, that's why we present the table no. 2 in Romanian.

We built on the cards. Also for the game to have a good dynamic and more than one entry in each round of play, we chose for each card game three components. The components were mixed together to get each card game components from different missions.

Table 2. The modality of coupling the missions

Mission 1	Mission 2
Joc de mișcare	Cauze care pot duce la densitate motrică slabă
Verigă a lecției	Elemente de organizare a activităților în lecție
Calitate motrică	Modalitate de interpretare a oboselii la elevi
Ramură sportivă	Criteriu de clasificare a lecțiilor de ed. fizică
Material didactic	Componente ale densității pedagogice
Faze ale evaluării	Deprinderi motrice utilitar-aplicative
Formație de lucru	Componentă a programei școlare
Criteriu de evaluare	Deprindere motrică sportivă
Obiectiv cadru al EFS	Deprindere motrică de bază
Parametru al efortului	Document de planificare
Document de planificare	Parametru al efortului
Deprindere motrică de bază	Obiectiv cadru al EFS
Deprindere motrică sportivă	Criteriu de evaluare
Componentă a programei școlare	Formație de lucru
Deprinderi motrice utilitar-aplicative	Faze ale evaluării
Componente ale densității pedagogice	Material didactic
Criteriu de clasificare a lecțiilor de ed. fizică	Ramură sportivă
Modalitate de interpretare a oboselii la elevi	Calitate motrică
Elemente de organizare a activităților în lecție	Verigă a lecției
Cauze care pot duce la densitate motrică slabă	Joc de mișcare

Table number 3 presents examples of components used in the teaching game Didactireka.

Table 3. Components for the playing cards in teaching game Didactireka

Nr. crt.	Name of component for teaching playing cards
1.	Pole
2.	The game 'Labyrinth'
3.	Box gym
4.	Cool down
5.	Improper place for activity
6.	Maintaining optimal health status of children
7.	Ball
8.	Mobility (flexibility)
9.	The theoretical level of knowledge
10.	The physical development
11.	Motor performance
12.	Annual plan
13.	Independent practice of physical exercises

We got 20 cards with missions (see Fig. 3) and 40 playing cards (see Fig. 4). Dividing by 8 cards per player (or team players), the maximum number of players (or teams of players) is 5.

Fig. 3. Card with missions for Didactireka

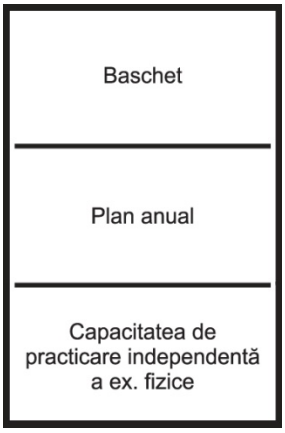

Fig. 4. Playing card for Didactireka

How to play Didactireka?

Each player receives 8 cards (or each team of players - the maximum players recommended per team is 4). The teacher (the main referee) keeps the mission cards and he will draw each mission card, reading top-down the missions from the card. There is still need for a second referee that will note the penalty points for each player (or each team), when they will accumulate throughout the game.

The purpose of the game

To get rid of all 8 playing cards by finding missions for them. The first player (or team) who remains with zero cards wins.

Preparation

- Mix the mission cards (see Fig. 3) and put the package in the middle, face down.
- Mix the playing cards (see Fig. 4) and divide with face down 8 cards for every player (or team).
- Players (teams) turn their cards face up, placing them on two rows of four in front of them (depending on number of players or teams the cards can be divided, as a variant of the game, 10 or 12 cards for each team, displayed on two lines).

How to play

1. Turn face up a mission card, read loud both missions and then put the card face up next to the package.

2. Everyone look for the first four cards a component that matches any of the two missions. You cannot look for components on a card from the bottom line only after you get rid of a card from the top row.
3. If you find a component that fits one mission you must put your hand in the middle of the table as fast as you can. You must explain why it fits with the mission.
4. If other players agree, you managed to get rid the playing card. If not, you have to take it back and you (or your team) receive a minus 1 point. The second referee notes the minus 1 point for that player (or that team). The next student who placed his hand on the table is being asks what is his component for the missions read.

After each round of play, the teacher presents examples of components for the two missions read.

The game has very good dynamics when is played by teams composed by 3 or 4 students. Any team member can get his/her hand on the table if he/she finds a component for the missions read.

In Fig. no. 5 we see a snapshot inside the game played with second year's students at a lesson.

Fig. 5. Snapshot inside the game

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TRAINING OF PERSONNEL IN LEADERSHIP POSITIONS IN SPORT ORGANIZATIONS

BARBU MIHAI CONSTANTIN RĂZVAN[1], BARBU CĂTĂLIN MIHAIL[2]

ABSTRACT. Succession management is a comprehensive system of assessment and development processes that support the attraction, development, rewarding and retaining talented individuals, from entry level position to senior management level. The succession in management programs may include employees and volunteers of the organization's top to lower levels. Depending on the organization's size or position, we may be consider different approaches to succession and talent in management and the types of opportunities offered to employees and volunteers to gain knowledge and capabilities. A sport organization can target an individual role (voluntary leadership role), the particular professional expertise or more general classifications (program coordinator). There are several key principles that contribute to effective succession in management, but, like within any other process, barriers in achieving effectiveness also exist within the processes of succession and talent in management. Jacobs (2005) suggests that there are six types of "slippage": inaccurate information and limited choices; a focus on one person for each specific role; a poor development of experience; misunderstanding of what is necessary for future success; failure in the implementation and exactly follow; the lack of explanations. Bernthal & Wellins (2006, pp 31-41) have identified five directions within the programs of succession and talent in management: *a) extending succession in management to lower levels of the organization; b) a successful profile to assess promptness; c) the person's total assessment for development; d) the selection of talents and experienced working population; e) accelerated development by teaching applied network of mentors / tutors.*

Keywords: training, succession, management, sport, personnel

REZUMAT. Formarea personalului cu funcţii de conducere în organizaţiile sportive. Succesiunea în management este un sistem cuprinzător al proceselor de evaluare şi dezvoltare care sprijină atracţia, dezvoltarea, recompensa şi păstrarea indivizilor talentaţi, pornind de la nivelul poziţiei de intrare până la managementul superior înalt. Programele succesiunii în management pot cuprinde angajaţii şi voluntarii din vârful organizaţiei, până la nivelurile inferioare. Depinzând de mărimea organizaţiei sau poziţiei pot fi luate în considerare diferitele abordări ale succesiunii şi talentului în management şi tipurile de oportunităţi oferite angajaţilor şi voluntarilor pentru a câştiga cunoştinţe şi capacităţi. O organizaţie sportivă poate ţinti un rol individual (rol al

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conducerii voluntare), expertiza particulară profesională sau clasificări mai generale (coordonator de programe). Există un număr de principii cheie care contribuie la succesiunea eficace în management, dar, ca în oricare alt proces şi în cadrul proceselor de succesiune şi talent în management există bariere în atingerea eficacității. Jacobs (2005) sugerează că există şase tipuri de „derapaje": informația inexactă şi alegerile limitate; o focalizare asupra unei singure persoane pentru fiecare rol specific; o dezvoltare săracă a experienței; înțelegerea greşită a ceea ce este necesar pentru succes în viitor; eşecul în execuție şi urmarea întocmai; lipsa explicațiilor. Bernthal & Wellins au identificat cinci direcții în cadrul programelor de succesiune şi talent în management: *a) extinderea succesiunii în management spre nivelele inferioare ale organizației; b) un profil de succes pentru evaluarea promtitudinii; c) evaluarea totală a persoanei în scopul dezvoltării; d) selectarea de talente şi din rândul forței de muncă experimentate; e) dezvoltarea accelerată prin învățarea aplicată şi rețele de mentori/îndrumători.*

Cuvinte cheie: formarea, succesiunea, management, sport, personal

Succession in management is a comprehensive system of assessment and development processes that support the attraction, development, rewarding and retaining talented individuals, from the entry level position to the senior management level. Effective optimization of talent requires a clear outline of the organization's strategic priorities, the profiles of successful leadership and the need of the capacity. Talent management is located within a circle of assessment, development and deployment of talent that includes identifying and developing internal talents and selecting new talents, external to the organization. Succession in management incorporates a long series of standardized methods for assessing performance and gathers information on employee and volunteer performance from several points of view. It is designated to supplement the manager's subjective judgments about the potential with respect to the potential, with the independent, objective data evaluation associated with the sequence of the relevant criteria.

Many business leaders have ambitions regarding the organizational management of their teams, but most of them can only dream of the perennial depth of champions in football. The succession programs in management may include employees and volunteers from the top of the organization, CEO or the Board of Directors, to lower levels. Depending on the size of the organization or position may be considered different approaches to succession and talent in management and the types of opportunities offered to employees and volunteers in order to gain particular skills, knowledge and capabilities. For example, a sport organization can target an individual role (voluntary leadership role), private business expertise (marketing and manager licensee) or more general classifications (program coordinator).

Most organizations focus their succession efforts in management on leadership roles in the first phase, the prospects for extending the process of critical roles in lower

levels in the future. These processes often have to replace the CEO, "which is transfer of executive authority of the latter from one to another". The development of these senior management roles can focus on how candidates experience a wide range of challenging tasks to develop their capacity and to include job designed on the individual learning needs, together with training programs and management training.

Other organizations have first identified critical roles such as labeling specialists in technology, statistical analysis, and operators in the first place. For these roles, focusing can fall on the multi-talent of a number of candidates to ensure the fact that there are survivors in the place where a position becomes vacant. Succession in management can also be targeted to professional roles where expertise is only available outside the organization and there may not be a focus for development outside the organization (High Performance Logistics Manager). For these roles of expert focus may fall on the rigorous development of professional expertise and on the stretched management development and leadership capacity. Transferring a high professional and specialized expertise to others, with the organization involved in activities such as "shadowing", is critical when there is no option to buy "expertise".

Development of whole groups of staff or volunteers in leadership and management development and other training initiatives rather than focusing on those who have demonstrated leadership potential is another approach used. These programs – "wider succession and talent in management" are designed to ensure the continued effective performance in an organization, division, department or work group by providing development and replacement of key people over time" (Rothwell, 2000, p. 5). The strategy of using training in general and not investing resources in the accelerated development of management may also be more appropriate for small sports organizations or those organizations providing a minimum budget to training. For example, an Athletes Federation could use internal recruitment to develop talents for critical roles (with a minimum cost to the organization); or a director of volunteers club Triathalon Club could work with a coach businessman and access the accelerated development of leadership by an external running program. The results should link with the required actions, with a strategic focus to producing the desired effect. The strategic planning will inform the model chosen, and the future organizational needs, market shifts, potential and individual development plus the social demographic changes. The assessment, monitoring and measurement required to ensure that the process continues to produce a sustainable succession and management talent.

Effective succession of managers in sport management

There are several key principles that contribute to effective succession in management. Eastman (1995) gives the following list of effective practices carried out usually: it receives a clear support from the CEO and from the top management; it belongs to the line of management and it is supported by staff; it is flexible and is selected by a strategic business plan; it involves a thoroughly process of reanalyzing

human resources; it is based on well-developed skills and on an objective analysis of the candidates; it is part of the management development effort; it includes plans for the development of service tasks; it is integrated into other systems of human resources; it stresses responsibility and purpose.

These fundamental components are supported by numerous studies according to which effective succession of the management systems is characterized by the involvement of the CEO, the support of the senior management, the alignment of the managerial identifying of candidates, the application of development tasks and the succession of management processes related to business strategies (Rioux, S. & Brenthal, 1999).

Conger and Fulmer (2003, pp 76-90) completed the prerequisite with five rules for the operationalization of succession in management.

The first rule, the fundamental rule on which the other four are built, is that succession in management is a flexible system oriented towards the development activities.

The second rule refers to the fact that the focus should include the starting positions, jobs that are essential for the long-term health of the organization. The third rule is that succession in management should be transparent, not secret. The fourth rule is the regular measurement of the progress. The fifth rule is to preserve flexibility. The other basic rule that comes from business consultants and academics is the need for CEO to take a clear position on the following issues: the expectations regarding the differentiation of talent; the leader's role in people's development; the philosophy regarding the movement of people in the business and their functions; the role of the diversity in personnel's strategy; beliefs about the payment for potential vs. payment for position; the role of human resources leaders.

Succession and talent in management should be part of the organization's strategy and of the human resource planning scheme and it should be aligned to the current needs and requirements of organizational involvement. Human resource planning includes guidance and demographic data analysis, growth rate provisions and the demand and offer of civic talent employment, the availability of external work. The programs of succession and talent in management should be developed taking into account these analyses and related to existing recruitment, performance management, training and development, leadership development and career planning initiatives (Kesler, 2002, pp. 1-8).

A model of approaching succession and talent in management

As discussed above, approaching succession and talent in management by some sports organizations should be shaped by its strategic goals, the context in which it is found, and the human resources requirements. While each organization will have different requirements within the policies and processes of succession and talent in management, there are a few basic components to develop an appropriate process. As noted above, the explanation for any scheme of succession and talent in management begins with the CEO and refers to managers of all levels, without their support planning

clearly not having success (Bernthal & Wellins, 2006, pp. 31-41). The six steps presented and then outlined in detail, provide an outline of work to design and implement a succession in management (APSC, 2003, p. 106): 1) planning/extending the process, 2) providing strategic integration, 3) assess the current situation, 4) identifying and assessing gifted individuals 5) implementation: planning and undertaking development, 6) evaluation.

The first step is the planning the process. In this starting phase, the organization must define a business case for the succession in management. The reasons for employment within succession and talent in management should be clearly outlined and the benefit brought to the organization should be assessed in relation to the strategic goals of the organization. The other critical element is the confidence that the process will be supported by the senior managers and also supported by the lower levels.

A developing research demonstrates the importance of the executive support (Carey & Ogden 2000, quoted by Sambrook, 2005, pp. 579-594). Ensuring that the process is transparent even from the outset is vital. If the transparency of the process is important, it is also critical that personal details be kept confidential. Feedback systems in terms of staff should be introduced in the process and developing a communication strategy in order to inform people about the process is also recommended, as well as providing specific information to employees.

The approach chosen should focus on strategic development of capabilities, which is why measuring results over time will be required. Planning scheme of human resources can be used to identify critical roles in the success of the organization and those that are likely to become critical in medium to long term. This sends us to the second step – the ensuring of policy integration. This integration should be considered in the demographic light of the organization and implications of the demographic change upon the application of candidates for critical organizational roles. Along with the human resource planning process, the process of succession and talent in management should be integrated along with the training and development plan and performance management system. For example Sports Center managers who will be involved in training the staff may need training in order to develop their talent as a trainer, thus they can lead effectively. This training should be integrated into the role of the job and build around it strategic imperatives of the organization (Rothwell, 2000).

This step, ensuring the strategic integration, implies also the identification of the distinct capacities that group leaders have, capacity that could provide a basis through which the organization is more efficient than its competitors, now and in the future. This will cater for future requirements of the organization, critical success factors, values, strategies and expected challenges. For example, answering questions coming from the media and producing television or radio interviews, may be a minor component of the obligations of a job as chief executive today; but if the sports organization's goal is only to launch a new style of competition, trainings realized on this subject, for the executive director and a small team of reporters, this could strategically improve the image of the organization through the capitalization of the increased potential due to exposure in the media.

Initially, the process of succession and talent in management should be told at least one or two levels below the target roles of building the required capacity and offering profoundness. By the third step, by estimating the current state of play, it is performed a risk assessment of possible departures from the existing already critical roles. This should draw, or sketch a demographic analysis of the scheme that starts from the working scheme of the human resources and designs future requirements in critical roles, taking into account internal and external factors and identifying the most pessimistic scenarios. Starting from this, the organization can determine the extent of any position on short term by designing requirements, internal mobility and deleting into the next 3-5 years. For example, most western countries are facing an old, aged working force, which means a critical consideration for many sports organizations; in the next 10 years, half of the directors and senior managers will retire. Despite numerous warnings about the impact of an aged working force, a recent survey of 578 companies revealed that more than one quarter of the business people of the USA are not ready yet for a major change in what regards the working force of the country considering that a record number of elderly workers retire from the service (Bernthal, & Wellins, 2006, pp. 31-41).

Any vacancies identified between the current capabilities for the key roles and future requirements could be addressed through relevant strategies of succession and talent in management including the development of internal capacity, external recruitment in order to aim immediately the particular vacancies, or programs for recruiting specialists. The fourth step is to identify and evaluate the potential. It incorporates the identification of critical roles in the organization and the development of a clear understanding of the capabilities required for effectiveness in those roles. These will include positions that exert a critical influence over the activities of the organization. The essential skills and competences identified are then drawn using powerful, important, and objective criteria.

These criteria are also used to identify and determine the source of high performance and high potential candidates. The organization will then define what it means being talented or with a high potential, both within the organization and in the context of critical organizational roles. For example, entrepreneurial skills, together with the initiative and attributes of a player within the team may be necessary to establish high performance in a sales and marketing role within a professional franchise in sports. As part of this process, the organization identifies people who might work well in target roles. The values of the organization and the management components required should also be considered with each individual performance and ability to learn. It is important to understand strengths, the potential of the identified and how these individuals can meet future requirements. It is vital to have accurate, precise identification and evaluation (Jacobs, 2005).

Subjectivity can be minimized by using multiple methods that are comprehensive and evidences based on the evaluation of potential and by identifying employees who could handle the specified roles.

A good start to review performance, potential and requirements of the development is the existence of management performance data including the following: biographical data; current performance; behavior observation; total feedback and all formal estimate of the results; interviews for determining career preferences; assessment of the possibility to remain in the organization; "behavior" interviews used to determine past performance in challenging situations; feedback from senior executives and relative evaluation of certain characteristics.

In most performance management systems the supervisor assesses the performance of the staff. In any case, succession and talent do not always occur if immediate supervisors. The assessment can be better performed by an external or a "third party" or within the higher/senior levels of the organization. The organization may also consider awarding individuals with opportunities of self-appointing and to express an interest in seeing certain roles based on preferences and personal objectives. A meeting for reviewing the higher/senior staff should be held in order to discuss individual reports, to agree on the list of "potential", and to establish the final list. The documentation for this process should include information about each employee, the potential, the level of performance, the career interests, the goals and the retention risk of each.

Any kind of internal capacity problems will become apparent at this stage through the possible short estimates and through the surplus of possible candidates. The analysis should not be done in isolation and it should also outline the analysis of the human resources used in human resources planning and it may include an assessment of the market factors regarding the availability of external skills and an assessment of the place where development resources should be focused. The fifth step is the implementation and this involves planning and implementing the program. The plan will outline the types of roles or experiences that could be offered as opportunities of rapid development, in correlation with future needs of the organization.

Larger organizations may want to assign particular "packages" of tasks such as "development roles" and to use these as development tasks for talented individuals. This step focuses on the development of the capacities required for each individual through a program for learning experiences, program that has performance objectives. The development plan should close any vacancy and/or strong existing skills; competencies and goals should be aligned with the organization's strategic plan. The development of opportunities could include a target task of the job, managing a project, a formal training program, or an external activity. Development can be accelerated in order to ensure an application of the staff suitable for the future applications of the role, and/or undertaking, as part of the organization’s working scheme, of management performances. Development plans incorporate factors such as individual capacity requirements, anticipating the challenges of the role, organizational required knowledge, and individual items.

Development plans usually include a plan that assigns/offers the individual the following: job rotation, special tasks and involvement; exposing a strategic agenda and the higher levels of the organization; strategies for self-development; access to high-level mentors.

It is important that the opportunities for the two methods of feedback and the regular review be built into the process of succession and talent in management. The organization should outline how often the revisions occur and should also follow development plans, noting that the reward structures are aligned with the program of undertaking development goals or targets. However, eventually people are responsible for developing their careers and are ready to face development goals and winning, the demonstration of new capacities. The individual must assume primary responsibility in order to face the targets under development and in order to maintain the reality of their performance. The last step is to assess, although it should be borne in mind that assessment as a process should be continuous. The organization should set periods to implement and evaluate the approach and its effects. For the organization, assessing its results could be established in the following terms: if the organizational risk was reduced, it reduced or not.

In respect of the individual, the evaluation could include self-assessment on the state of the capacity and changes demonstrated in performance and behavior at the workplace. The total process of succession and talent in management should be monitored. This may include periodic assessment of the progress within the individual development plans, the degree of involvement of the current leaders or senior and the share of internal and external appointments.

Critical aspects of implementing succession in management

As in the case of any other process and within the processes of succession and talent in management, there are barriers in achieving effectiveness. Jacobs (2005) suggests that there are six types of "slippage", commonly encountered, which cause destruction of the results within succession and talent in management and he also offers methods of avoiding these.

Table 1. Types of slippage and methods of avoiding them

"Slippage"	Methods of avoiding "slippage"
Inaccurate information and limited choices	Personal relations and subjective experiences should be minimized in the identification and assessment of future leaders. Managers may relate too much with a small group of people and thus they limit the number of roles for which a person can choose.

A focus on one single person for each specific role	If an individual chooses a replacement and develops only in this one for this role, expectations are limited. Focusing on a common fund and developing this replacement provides flexibility and more options for each.
A poor development of the experience	Although development activities are often part of the training session, they may be based on current requirements and not on future requirements. Development activities, which develop skills, build experience, test thinking, sculpt emotional intelligence and promote visibility, are those which should be used.
Misunderstanding of what is necessary for success in future	Evaluation of performance capabilities from the past and from present shows that the strengths of the individual, his own style and motivating factors will undoubtedly lead him to success in a future position. The accuracy of personal perspicacity, actionable feedback, and a clear perspective over capacities and future requirements can be gained by a coach or mentor.
Failure in execution and the exactly follow	Failure is primarily referring to not seeing the succession as a continuous, ongoing process and may lead to isolation from the daily pressures of business. To avoid this result, the development plan should be customized and should have clear goals, and actions should be integrated into other management systems and responsibilities.
Lack of explanations	Like any other critical management strategy on human resources, power, the talent nursery, needs discipline, focus and commitment at all levels. To ensure its effectiveness, the senior / upper group of managers needs to build a talented pool acting as a key performance indicator, and to involve in monitoring and developing talent within the organization.

Source: D., Jacobs, *In search of future leaders: Managing the global talent pipeline*, Ivey Business Journal Online, March/April, 2005, p. 7

Directions in succession and talent management

Analyzing the results of a study realized on more than 4,500 leaders of more than 900 organizations, Bernthal & Wellins (2006, pp 31-41) have identified five directions within the programs of succession and talent in management: *a) extending succession in management to lower levels of the organization; b) a successful profile to*

assess promptness; c) the person's total assessment for development; d) the selection of talents and experienced working population; e) accelerated development by teaching applied network of mentors / tutors.

Extending succession in management to lower levels of the organization. Many organizations expand succession in management in order to include assessment and development of individuals at lower levels in the organization, reflecting the need for organizations to penetrate deeper into the lower rows thus preparing probable future openings. This implies the existence of a development plan that includes certain types of assessment for a long term management position. These individuals with a greater potential can be guided to the predetermined careers.

A successful profile to assess promptness. Organizations identify a pool of people with a high early potential in career and put them under close supervision in order to prepare them for a variety of positions. While the oportunity of an individual assessment and the planned development are too expensive and take too long for delivery to each individual, the identification and growth of the organization's potential provide a larger group of leaders in the future.

The person's total assessment for development. The use of multiple assessment tools produces a deeper appreciation of personal / motivational attributes, business management, leadership positions and interpersonal skills for a role superior to the current level of the individual. Using identifying talent and development programs highlights the employees who have potential. Bernthal and Wellins suggest an overall assessment of a leader despite a successful profile to address the essential preparatory experiences – what each has done, organizational knowledge - what each knows, defining behavior components, what each is capable to do and personal attributes that may include "slippage" or constraints for top-level leaders / seniors, who is each. Successful profile requirements vary by level or position, the function of the job or the role, and the particular strategy and the culture of the organization.

The selection of talents and experienced working population. The selection and deployment of talent involves profiling leaders (individuals or teams) against specific strategic challenges to achieve an effective setting and to promote decisions. Evaluation and development of current employees and volunteers play a critical role in this process, but how organizations monitor and pursue their talents may be changing. As I stated before, retiring aging working force threatens to fully exhaust the number of skilled individuals available to organizations. Many will choose to stay active in the labor force but at a reduced level of involvement. Regarding sports organizations that recruit volunteers, this group may provide a target population that is growing and whose aim is extending the mutual fund of volunteers.

Accelerated development by teaching applied network of mentors / tutors. Development prepares individuals for the roles and future challenges and therefore it is central to optimizing the talent. The development of experiences that relate learning experiences with real life challenges through learning and action has proved to be very effective. In order to minimize the risk of giving someone a negative experience into a

higher role, a network of expert tutors can provide guidance. The banks of talent that list all employees and their areas of expertise and experience can be used to develop a network of experts, who may be consulted when development challenges are encountered.

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COMPLEMENTARY METHOD IN TEACHING DIDACTICS OF PHYSICAL EDUCATION: MODIFYING THE GAME "SWAMP" INTO A DIDACTIC GAME

VĂIDĂHĂZAN REMUS-CRISTIAN, PRODEA COSMIN IOAN[1]

ABSTRACT. Each teacher, we are convinced of this, is looking for the most effective strategies for teaching. The result of implementing effective strategies translates into increased motivation among students through a very pleasant learning situation in order to make the students to exclaim at the end of the seminar "Yes! We want more." This exclamation is met when children participate in very enjoyable and exciting games. Every game is an activity that generates pleasure and joy, satisfaction or dissatisfaction; it is a stimulus for creative activity. Although it is a mean of relaxation and fun, the game has important educational functions. It contributes trough logically content to intellectual development, following the progress in the ever changing environmental conditions of play. The integration of the didactic game into seminar strategies will determine the students to participate with their whole personality. The didactic game develops the spirit of observation, attention, imagination, divergent thinking and critical thinking. It will cause students to subordinate personal interests to the interests of the group. Thus, based on the idea that in the physical education lesson the games (dynamic games) influence all students to be active and motivated, which solve at a high percentage the proposed tasks for that lesson, we thought that converting a motion game into didactic game can motivate students to engage in the activity proposed at seminar. The result was to transform the dynamic game "Swamp" into didactic game. We managed to apply this strategy on several groups and the answer from our students was "Yes! We want more." This article presents all the details of this transformation. This specific activity was very successful with all groups to which we applied this strategy. Also, preparing for this kind of activity does not require large time resources. We recommend everyone to try at least once, this didactic game.

Key words: teaching game, physical education, didactic, strategy, seminar.

REZUMAT. Metodă complementară în predarea Didacticii EFS: transformarea jocului de mişcare „Mlaştina” în joc didactic. Fiecare cadru didactic, suntem convinşi de acest fapt, este în căutarea celor mai eficiente strategii pentru desfăşurarea propriei activităţi didactice. Implementarea unor strategii eficiente se traduce prin motivaţie crescută în rândul studenţilor, printr-o situaţie de învăţare foarte plăcută, distractivă, interesantă şi relaxantă, astfel încât să-i facă pe studenţi să exclame la sfârşitul seminarului „Da! Mai vreau.”. Această exclamaţie o întâlnim la copii când

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participă la jocuri de mişcare foarte plăcute şi incitante psihomotric. Jocul de mişcare este o activitate generatoare de plăcere şi bucurie, satisfacţie sau insatisfacţie, este un stimulent al activităţii creative. Deşi este şi un mijloc de relaxare şi de distracţie, jocul are importante funcţii instructiv-educative. El contribuie, prin conţinutul său logic la dezvoltarea intelectului, urmărind învingerea, în condiţii mereu schimbătoare ale mediului de joc, a diferitelor dificultăţi sau obstacole ivite în calea atingerii scopului propus. Astfel, pornind de la ideea că în lecţia de educaţie fizică jocurile de mişcare (jocurile dinamice) contribuie la o participare activă şi mult mai motivată a tuturor elevilor, ceea ce duce la rezolvarea într-un procent ridicat a sarcinilor propuse în lecţie, ne-am gândit că transformarea unui joc de mişcare în joc didactic poate motiva puternic studenţii pentru a se implica în activitatea propusă la seminar. Rezultatul a fost transformarea jocului de mişcare „Mlaştină" în joc didactic. Am reuşit deja să aplicăm pe mai multe grupe această strategie şi de fiecare dată răspunsul studenţilor a fost „Da! Mai vrem.". Acest articol cuprinde modul prin care am creat jocul didactic „Mlaştina". Activitatea a avut mare succes cu toate grupele la care am aplicat această strategie, pregătirea activităţii în timpul seminarului nefiind consumatoare de resurse temporale mari. Recomandăm tuturor să încerce, măcar o dată, acest tip de joc didactic.

Cuvinte cheie: educaţie fizică, didactic, joc, strategie, seminar.

Each teacher, we are convinced of this, is looking for the most effective strategies for teaching. The result of implementing effective strategies translates into increased motivation among students through a very pleasant learning situation in order to make the students to exclaim at the end of the seminar "Yes! We want more."

This exclamation is met when children participate in very enjoyable and exciting games. Every game is an activity that generates pleasure and joy, satisfaction or dissatisfaction; it is a stimulus for creative activity. Although it is a mean of relaxation and fun, the game has important educational functions. It contributes trough logically content to intellectual development, following the progress in the ever changing environmental conditions of play.

The integration of the didactic game into seminar strategies will determine the students to participate with their whole personality. The didactic game develops the spirit of observation, attention, imagination, divergent thinking and critical thinking. It will cause students to subordinate personal interests to the interests of the group (Dulamă, 2008).

Thus, based on the idea that in the physical education lesson the games (dynamic games) influence all students to be active and motivated, which solve at a high percentage the proposed tasks for that lesson, we thought that converting a motion game into didactic game can motivate students to engage in the activity proposed at seminar. The result was to transform the dynamic game "Swamp" into didactic game. We managed to apply this strategy on several groups and the answer from our students was "Yes! We want more."

In the following you can read all the details of this transformation.

I played for the first time the game "Swamp" in 2006 at Palestra Center Summer School (Câmpeanu, Muşat, Pop, Negru, Batali, & Văidăhăzan, 2007).

This game requires a minimum area of 2 m wide and 3 m long. The playing surface is composed of several rectangles (see Fig. 1).

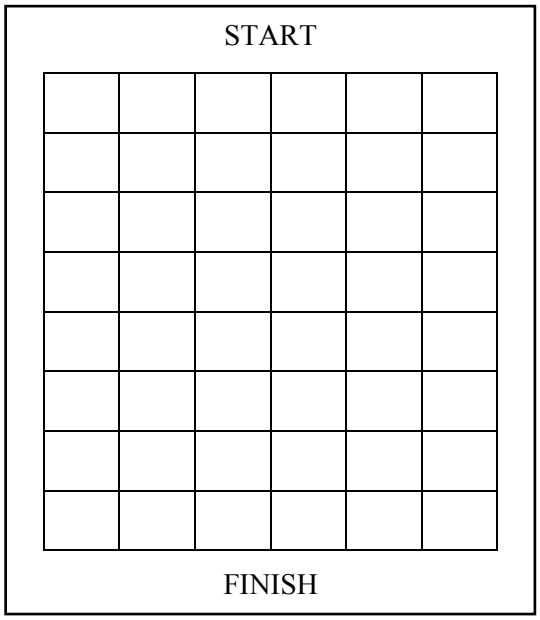

Fig. 1. The playing surface for the game "Swamp"

It takes a referee who will watch how the team assigned to this area of the game will relocate all participants from start to finish. Each participant must pass, when his turn starts, from side to side. They must reach near referee.

The entire team is allowed to help with indications the teammate who is trying to pass the swamp. The person who arrives next to the referee is no longer allowed to help his team.

There are specific rules which apply to participants when they pass the swamp. There are "magic tiles" you need to find and you can get beyond only if you step on them. If you do not step on a magic tile then you fall into the swamp and you must return to start.

The location for the magic tiles is listed on the referee's sheet, and the referee watches the route of the person who is on the playing surface. The referee must not reveal the location of magic tiles, he must say only if the participant stepped or not on a magic tile.

A possible configuration of the "magic trail" can be seen in Fig. 2.

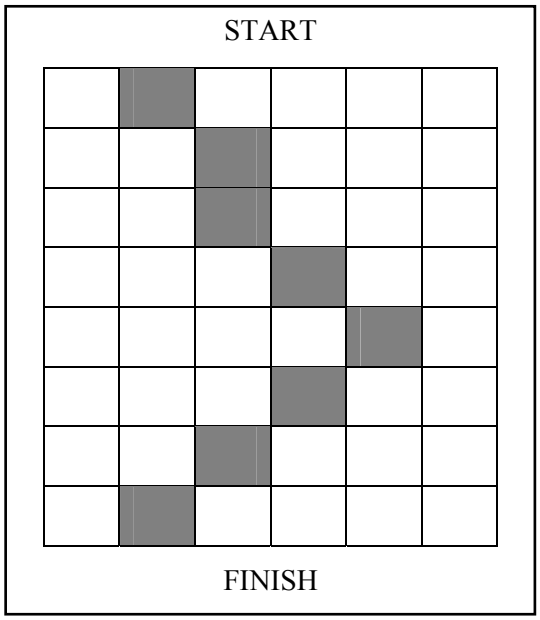

Fig. 2. The referee's sheet

It is mandatory that each row contains a magic tile. If we want to shorten the playing time we place the magical tiles in way that are in contact with each other. The magic tile on each succeeding row can be marked only to the left, to the right or in front of the magic tile in the row above.

The didactic game starts with the rules described above but because the rooms for the didactic activities do not have enough space draw at least two areas of the game, we thought to reduce the playing area. So, we didn't mark the floor. Instead, we drew the playing area on a piece of paper. Thus, the proposed game takes place on a piece of paper with the size of an A4 sheet (29.7/21 cm).

We printed the playing surface on a sheet of A4 paper. In this way you can build many more surfaces to play and the game can applied to a numerous class, involving all students that attend for the didactic activity.

What we introduced in addition to original game in order to adapt the didactic game to specific objectives? We chose several definitions; in this case we chose the definitions for effort's parameters: volume, intensity, duration, density and complexity.

Here is, for example, the definition for effort's volume: "The effort's volume represents the total amount of mechanical work performed."

We divided this definition for eight boxes as you can see in Fig. 3

	The effort's volume				
		represents			
		the total			
			amount		
		of			
	mechanical				
work					
	performed.				

Fig. 3. The referee's sheet with the definition of effort's volume

The team from this table received a pawn to play (a piece of plastic, in this case a piece from the game backgammon) and an A4 sheet with empty squares as shown in Fig. 1.

The first player must place the pawn on the first line. If he/she discovers a magical tile the referee must tell him the corresponding text for that particular tile. When the pawn is misplaced the participant goes to start. When the participant returns to the magic tiles already discovered, he/she must say the corresponding text for that particular tile. Thus, the definition for the effort's volume is repeated by the player and his team many times until they find the entire route to cross the swamp.

With another group, students of third year, we complicated the situation, leading to the emergence of new roles in the team. We used a simplified definition of classroom management. This text is more complex than the definition for effort's volume; thus we allowed the team to use pen and paper.

The corresponding surface for this example is shown in Fig. 4.

	The classroom management			
		studies		
		theoretical and practical		
	classroom structure			
in order to provide				
	teachers			
		effective		
			intervention models.	

Fig. 4. Referee's sheet with the definition of classroom management

There was a new important role in the team, the person who takes notes and forwards it to the teammate that crosses the playing area. An important issue that students need to realize is that they have to change roles in the team because if you stay focused on the notes you are not able to learn the route. This may disadvantage the team when the person who took notes remains the last one. This person must discover the route having no support from his/her team.

The entire activity runs as a competition between many teams. Thus, every second counts. We recommend building teams with the same number of participants and all teams have to start simultaneously.

In conclusion, we confirm that this specific activity was very successful with all groups to which we applied this strategy. Also, preparing for this kind of activity does not require large time resources. We recommend everyone to try at least once, this didactic game.

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GLOBALIZATION OF SPORT AND SPORTS INDUSTRY

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ABSTRACT. The processes of globalization and development are part of the global sport today. Current trends are focused on specific cultures. Sport and the media are interdependent and part of the global system. In this article we examined: the production of culture media / sporting goods, sporting goods form and content, media and political and economic aspects of consumption series.

Key words: culture, media, sport, political, economic

REZUMAT. Globalizarea în sport şi industria sportului. Procesele globalizării şi dezvoltării sunt parte a caracterului global al sportului în zilele noastre. Tendinţele actuale sunt orientate spre culturile specifice. Sportul şi mass-media sunt interdependente şi sunt incluse în sistemul global. În acest articol am abordat probleme legate de: producţia culturii media, producţia de articole sportive, forma şi conţinutul articolelor sportive, aspectele politice şi economice ale consumului bunurilor de serie.

Cuvinte cheie: cultură, media, sport, politică, economie

Canadian sociologists Macintosh and Whitson claim that the main organism managing the Canadian sport, is deviating from the long-termed consensus of Canadian educational institutions, i.e. that "sport exists in school systems due to its educational value" and its merits of recreation. They suspect that Canada is now heading to the development of "a system orientated to performances" which produces an elite or, in other words, professional sportsmen.

They provide arguments that the initial "professionalization" of the Canadian sport in schools has come into place under the influence of corporations, as well as governmental interests, reflected in using sports elite as a means of national promotion in global economy.

Sports image and sports events are rather important for electronic' media and the press. Sport spectacles are carefully followed national and international sport industry. In this way, a connection between the consumers' corporations and large audience of radio listeners and TV spectators is being created. More than half of the most followed TV programmes are sports manifestations.

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The development of sport and its significance for audience and mass - media during the XX century was characterized by the growth of their interdependence. For example, a study on the level of mass -media rating and the coverage of the summer Olympic Games that took place between 1956 and 1984, confirmed that TV networks relied on the transmission of those Olympic Games, having in mind the contents of their programmes, but not forgetting the profit.

In the same way, the International Olympic Committee has earned significant incomes thanks to television (more than 20 million $ was the profit of the Olympic Games in Los Angeles in 1984), and became more dependent on the mass - media sponsorships to develop its operations. In the entire world, 3 billions of people watched the Olympic Games in 1988. Numerous audience means great profit. For example, NCAA has recently negotiated a contract of 1 billion $ with CBS to show the basketball tournament "Final Four NCAA" on TV in the period of 7 years.

The influence of sports industry is also growing; so that sport industry, depending on the mass - media, schedules sports events, structures its range and, sometimes even modifies the rules of some games in order to attract greater audience of corporations' marketing.

The real influence that powerful industries and companies have on contemporary trends in international sport could be noticed on the example of the way the jubilee Olympic Games of 1996 were awarded to Atlanta, the city of Coca-Cola. The Greeks, who were assigned to organize of the Olympic Games in Athens in 2004, should have organized and should have been the hosts of the Olympic Games 8 years ago. They got this promise from the International Olympic Committee and its president Huan Samaran. The reason why the jubilee Olympic Games should have been awarded to Greece was perfectly justified and serious - this should have been the crown of the centenary since the first, renown Olympic Games had been organized and held in Greece in 1896.

However, Atlanta and America obviously had "more powerful means of persuasion and influence", so that the Greeks, disappointed and deceived, had the opportunity to see the point of the message of Jan Paul Sartre, a philosopher and a writer, who said: "The Olympic Games have always been stained by politics and have always been political. No matter whether they took place in Mexico or Munich. Anyway, it is enough to have a look at the world. Is there any form of culture, art or science which is somehow not connected with politics?" Unfortunately, having said these words, Sartre disallowed the idea of Olympic movement established by the baron Pier de Coubertin.

The Greeks had to wait the next Olympic Games in Sydney to be finished to be awarded the organization of the Olympic Games in 2004. Allegedly, only then were the appropriate conditions met, not existing before - a bit hypocritical argument, considering the fact that the Greeks were the creators of Olympic competitions in 776 BC and the ones who renowned the modern Olympic Games.

In the last decades, the integration of sport and the informational industry has become more complex and global. The sociologist Maguire analyses the increase of the interdependence between the mass - media, sport organizations and advertising agencies

within an international configuration which he calls "press/ sport/ production complex". He discusses the variety of theoretical perspectives that show us how the growth of global press/sport formations restructures and propagates cultural and political events of corporative capitalism.

In general, it has been pointed to the fact that that sport organizations now depend on their presence in mass - media, which makes them possible to attract sponsors. In the same time, sport manifestations provide an audience of international media whose number is constantly growing, while the costs of production are very low. Sport, relying on action more than on giving statements or producing intrigues, can be efficiently exported if the market is being fostered.

In short, sport programmes can be easily exported to places where they can serve as an avant-garde in the globalization of sport marketing industry.

Modern feministic movement in sport

Feminism is a movement that pretends to make an end to sexism, i.e. to the tendency of expressing oneself according to individual's sex. Feministic provocation of the patriarchal law and the feministic critics of andocentric system of knowledge coming from west industrial cultures have their roots in XVIII century.

The appearance of modern feministic movement in the 1960s was followed by numerous "studies on women" in the countries like Australia, Canada, USA and western European countries like Scandinavia.

Feministic analysis of sport is pretty recent. Not until 1970s have the feminists from various universities begun to elaborate critics on the account of sport as "a fundamentally sexist institution, dominated by men and masculine by its orientation".

The '80s witnessed the development of feministic researches in the field of sports studies. Feminist analyses discovered a hidden history of women athletics and examined the differences between sexes in the patterns of sport socialization; they proved that the dominant institutional sport forms have naturalized the power of men and their privilege over women. It was said that the marginalization of women in sport produces structural and ideological domination of men over women.

Feministic theory began to broaden its domain to certain political preoccupations in the '80's. Attempts have been made to undertake feministic analyses beyond the primary accent that has been put on the known inequality of sexes, in order to include the analyses of some other forms of social domination, like social classes, race, ethnic groups, or sex. Thus, the feministic studies in sport became more critical, that is, more dedicated to theoretical efforts outlining sex relations in sport, connected to various systems of domination, relying on the ratio of powers and the fight for freedom.

Like feminism, cultural studies represent an international intellectual movement, originating from different cultural and theoretical perspectives.

While traditional sociology strives to encompass different forms of determinism (structural and economical forces that form events and/or behaviour), the followers of

cultural studies recognize the role of human agent and political resistance in social life. As Fiske says, "social order restrains and oppresses people, but at the same time it offers resources in the struggle against these oppressions."

The efforts made in the domain of cultural studies, as well as the efforts made in feministic studies, are not considered as being just an academic exercise, but, even more, these efforts strive to become engaged politically and to transform social world that is the object of their studies. For this reason Hall said: "Sociology, i.e., sport and leisure sociology should be engaged politically and there is no dichotomy between the role of a citizen and the role of a scientist."

The noticeable confluence of cultural studies and feministic theory can be seen as an expression of growing global interdependence expansion. Cultural feministic studies encompass huge number of theoretical perspectives and methodological approaches that exceed international, political and cultural limits. In the same time, the linking up of feministic theory and cultural studies in sport sociology promise to encourage the understanding of some significant processes of globalization through the analysis of changes in the relations between the dominant and subordinate cultures, feministic and male communities, white people and Negroes.

Women and Sport

Speaking of certain capacities specific for women, and, before all of specific morphological-functional and motor abilities women have, we cannot do otherwise but refer to the comparison with the same abilities of men, eventually always getting the attribute of lower biological value. We cannot deny that such a comparison could lead to wrong conclusions on powerful role of female being in a society, and in this case in sports, too.

However, we think that the failure to recognize the existence of significant differences between men and women and the lack of understanding the domains of female being and expression can have an influence on real world and sport and may encourage us to create unequal relation between men and women, even in the domains in which those differences should not exist.

Only realizing real essence and the capacity of women can we discuss the real value of women in society and their true contribution to social and sport development.

Let us remind ourselves about the characteristics of female organism which really differ from those of men, and which can in every sense determine the existence of women.

Certain differences can be noticed even during intrauterine life of a foetus, or, more precisely, in the second month of intrauterine development when a certain amount of oestrogen female sexual hormone starts to be exuded. It will probably have some influence on certain characteristics of female foetus from the very beginning. It is thought of increased distinctions considering body length and weight (female new born babies are slightly lighter and less long than male ones, with more fragile bone and muscular constitution and with more subcutaneous fat tissue.

Following the development and differences between boys and girls in the period of childhood (more precisely, preschool period) we can notice that in this period the differences are the least pronounced, but that there are some, in morphological, functional, psychological and motor aspect.

We have already pointed to the fact that in the period of an infant, young child and throughout pre-school period the body height in the case of girls is in the average lower than the height of boys. This small difference lasts until the period of sexual maturation, which starts earlier in the case of girls, so that they leave the boys behind regarding height, but in the later period this situation changes and boys, i.e. males exceed females and are about 10 cm higher than girls, on the average. If we consider trunk and legs length we can conclude that women have higher values of trunk length, but lower values of legs length in comparison to men.

Considering the values of body weight, it has been noticed that in the case of a female child this value on the average will be lower in comparison to boys and that this difference remains during the whole life, with the acceptance of the period of sexual maturation, then girls are generally heavier than boys.

In the case of women, joints and joint links are of more fragile construction; bones are smaller and lighter and amount up to 1.6% of total body weight, as distinguished from men whose bone weight amount to 18% of total body weight. Certain differences in morphological structure can be noticed in pelvis construction which is in the case of women broad and low, and due to this the haunch bones which are shorter converge with the knee under different angle, which explains the limited capability of women in relation to men to achieve results when jumping and running.

Certain differences between boys and girls can also be seen in functional characteristics, such as the type of breathing, the frequency of breading, vital lung capacity, pulse frequency, etc.

The most common type of breading with children is stomach breathing, in the case of women prevails chest breathing, while men keep the stomach breathing.

The frequency of heart work is almost the same considering boys and girls until the period of sexual maturation, when this value is higher in the case of women, both in the state of resting and under maximal pressure. Women also have a higher frequency of breathing. Lung ventilation (maximal) in the case of girls is lower in relation to boys, even in the later periods of life. Higher values of this functional capacity are measured in girls in comparison to boys only in the period of sexual maturation.

The values of oxygen consumption, both in the state of rest and under maximal consumption during life are always higher in the case of men. With an adult man these values are even 20% higher than those measured with women.

If we want to point to some differences in certain periods of life, and if we are to confirm whether there are differences in motor behaviour between boys and girls, men and women, we will come to the following data:

- Arguments in favour of negative answer regarding the existence of significant differences in motor behaviour of boys are girls are numerous reports on pupils'

developmental characteristics at pre-school age. However, significant number of recent research are in favour of positive answer, creating pretty exact base for disputing the fact that there are no differences between boys and girls regarding motor behaviour.

Is it still possible to find an answer regarding the cause of noticed distinctions at this age? The influence of biological factors is possible, but since until recently only modest researches and tests have been undertaken in this field, especially at this age, we could to some extent distance ourselves from the belief that biological laws in the development of girls and boys phenotypes are crucial factor in the existence of the noticed differences in motor behaviour.

Perhaps an answer to the question why at some motor tasks and motor behaviour an advantage can be given to boys, should be searched for in social context, implying that we should analyze social frames in which a woman is educated as fragile, protected creature in contrast to boys who should be stronger, braver, more persistent. We must not neglect the influence of parents and environment, directing boys to livelier, more competitive, harder games, in contrast to girls who are inclined to more peaceful, more subtle and less dangerous toys. There should be relatively small differences between sexes during the period of childhood and regarding the efficacy of motor performance, since both boys and girls have equal chances to practice, equal encouragement to learn and the same equipment is accessible to all the children (here we think of the facilities in a preschool). However, there are certain cultural factors which play an important role when determining which skills are to be learnt by individuals of male or female sex, and these factors are preserved and present (even more) at older ages. In the activities of play and exercise at early age, girls are not encouraged to participate in activities requiring speed and strength, like boys; on the contrary, they are more directed to drawing, playing with dolls etc... We have to admit that habits customs and tradition are not in the least insignificant for the development of a child and that there are certain socially respected types of behaviours for boys and girls in every culture. Of course, this alternative should not be accepted as completely reliable, so that it would be desirable to check it well in empiric or broader researches.

However, in spite of all the indications that there are certain differences in motor behaviour of boys and girls at pre-school age, there are programs of physical education and early sport guidance which treat children equally regarding sex, so that planning and programming of physical education in pre-school institutions is not carried out according to sex. On the other hand, it is likely to notice educational situations involving certain concrete activities in which pre-school teachers tend to pull girls and boys apart, grouping them separately. In the same time, sometimes it is possible to notice self-initiated separation of girls and boys, perhaps resulting from the fact that children are often encouraged to participate in male activities (sports activities) and female ones.

At early school age, more precisely in the period between 7 and 11 years, there is a period of gradual specific development of female organism, before all under the influence of increasingly expressed stimulating effects of gonad tropic hormones of

pituitary gland. The influence of oestrogen on female organism is particularly manifested in the period of puberty, leading to specific development of young female organism (of course, an individual is under the influence of numerous others endogenous and exogenous factors, like education, way of life, physical exercise...). According to all the stated differences leading to more expressed distinctions in the development of motor capacity and abilities between girls and boys, there is a need of different programming and planning of the contents of physical education, as well as the need of specific guidance to certain sports disciplines.

In subsequent periods of life, the differences between male and female sex, in the development of their physical abilities before all, and consequently in reaching their maximal achievements in certain sports disciplines, are more expressed. Having in mind all the mentioned anatomic-physiologic, psychological and other characteristics of women which make the basis of different abilities, a woman must not be considered as a being with lower or partly limited abilities in comparison to man, just as women should not compete with men regarding sports abilities and results.

In spite of the fact that women got involved in sports competitions later, which is documented by their first participation in the Olympic Games in Paris in 1900, today there are only few, if any sports discipline women do not participate in. Earlier, and even now, there are opposite opinion on whether all sports disciplines really suit a female being, i.e. her psycho-physiological features.

For example, if we want to consider stamina as physical ability, we shall notice that it is lower in women at all ages in comparison to men. In mature, adult period these values are higher than 30% in the case of men, suggesting the fact that women do not have preconditions for activities requiring long-lasting efforts, but this does not shut them down. It was thought before that the activities demanding extreme stamina do not suit female organism. We will mention only few such activities: athlete long distance running, marathon, before all, long bicycle races, long section swimming... However, many dilemmas have been resolved when in 1982 a Portuguese Mote Rosa at the European athletic championship, achieved a rarely high result in the hardest athletic discipline -marathon, which could easily and on equal terms parry the results achieved by men. According to Astrand, a woman should not be prevented from taking part in the most difficult sports disciplines, if they trained rationally and if it were a pleasure to them. It is also evident that in contemporary societies it is not an issue whether and which sports discipline a woman can take part in. Dealing with this question would be too conservative attitude, but, on the other hand, the problem of dealing with too difficult, tiring professional sports disciplines has to be considered in a very subtle way considering particularly specific and sensitive biological and psychophysical construct of female organism.

Comparing strength as a physical ability in women and men, it certainly can be concluded that the strength of men is in almost all periods of life 30-70% higher than women's strength. In spite of the fact that exercises with high load involving extreme physical strength are not recommended to children and youth who are still developing,

and to female population (e.g. weight-lifting and body-building, which can cause changes on the pelvis, implying difficult consequences while giving birth, as well as high pressure which can cause intensified bleeding in the abdomen; these disciplines can cause changes in womb position), women are today present in the mentioned sports.

According to Firica "maximal general ability of an adult woman, depending on her specific functions, is on the average about 77-94% of maximal general ability of an adult man. Maximal limits of female psychophysical abilities are in the scope of the stated relations expressed in percentage, with a comment that an adult woman has lower maximal speed, strength and stamina, and in the range of motor abilities weaker speed-strength and tempo-stamina in comparison to men, compensating for these handicaps with higher precision and sensibility of movements, and especially with far better and emphasized suppleness and nimbleness of her body in relation to an average man. Therefore the classification and guidance of women towards certain typically "female" sports disciplines (rhythmical gymnastics, dance, artistic swimming etc).

Resuming all that has been said so far, an important issue could be justifiably raised concerning the question whether the participation in certain sport disciplines, as well as top sports in general, has the same meaning and addresses the needs of both men and women. The reason should probably be searched for in general social position of a woman reflected in her participation in sports. Some statistical data point to the fact that the ratio of men to women in sport is 4:1, in spite of the fact that the number of female population is similar to the number of male population. The number of "female" sports is really small in comparison to "male" sports, and, in the same time, socio-biological reasons (pregnancy, birth-giving and maternity) are also very important. However, despite these reasons, women are more and more involved in sport and female sport is increasingly developing and expanding.

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IMPLICATIONS OF THE USE OF CARBOHYDRATES IN SUPPORT OF SPORTS PERFORMANCE

NICA BADEA DELIA[1], & MONEA DAN[2]

SUMMARY. This paper outlines the design and results of research related to the consumption of carbohydrates during physical effort which conducts to a high sports improvement. The postponing of the settling and/or reducing fatigue intensity can be described by a series of effects, such as: reducing the use of muscular glycogen results from stimulation of the muscle glycogenogenesis, the prevention of settling hypoglycemia, reducing the overall rate of carbohydrates oxidation, etc. Carbohydrate supplementation received a lot of attention and a large number of studies demonstrated that fatigue was delayed and performance was improved when exercise lasted two hours or longer. Indeed the study revealed that with a carbohydrate mouth rinse, certain areas of the brain such as the reward centres and areas involved in motor control were activated. Factors influencing the favourable effect of the disorders in sports performance are intensity physical effort (only occurs if the benefit effort reduced intensity and especially durable, i.e. if the efforts of up to 75% of VO2max), carbohydrates intake and form of use, but also on the level of the initial results from the muscle.

Keyword: carbohydrates, carbohydrate suppliment, performance evaluation, physical exertion

REZUMAT. Implicaţii ale utilizării carbohidraţilor în susţinerea performanţei sportive. Lucrarea subliniază concepţia şi rezultatele unor cercetari legate de consumul de carbohidraţi in timpul efortului fizic fapt ce conduce in mod cert la imbunatatirea performantei sportive. Prin amanarea instalarii oboselii si/sau reducerii intensitatii acesteia se pot explica printr-o serie de efecte, cum ar fi: reducerea utilizarii glicogenului muscular, stimularea glicogenogenezei, impiedicarea instalarii hipoglicemiei, reducerea ratei globale a oxidarii glucidelor, etc. Administrarea suplimentelor de carbohidrati a captat atentia si un număr mare de studii a demonstrat că oboseala afost amânată şi performanţa a fost îmbunatăţită pentru exerciţii cu o durată de 2 ore sau mai mult. Într-adevar studiile au aratat că ţinând în gura o soluşie de carbohidraţi câteva arii ale creierului precum central recompenseşi ariile implicate în controlul motricităţii au fost activate**.** Factorii care conditioneaza efectul favorabil al glucidelor in performanta sportiva sunt intensitatea efortului fizic (beneficiul survine doar in cazul efortului de intensitate redusa si mai ales moderata, adica in cazul eforturilor de pana la 75 % din V_{O2max}), doza si forma de carbohidrati utilizati, dar si de nivelul initial al glicogenului muscular.

Cuvinte cheie: carbohidraţi, suppliment carbohidraţi, evaluarea performanţelor, efort fizic

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Introduction

Research on sports performance underlines the great complexity of biochemical mechanisms that, in these conditions guarantees: the cardiovascular activity, respiratory activity, the metabolic activity, the neuromuscular activity of the neuroendocrine glands and neuropsychological activities. Deeper understand of these physiological mechanisms capable of the human body biological potential update, high performance sports present at higher levels compared to those attained in previous decades. Today, it is known that a modern sport is not only an increased muscular effort, but mostly exertion, neuropsychological, requiring entry in the action of all biological and physiological mechanisms mentioned. The lost nutrients enssuring capableof replacing the muscular substantial loss is far from satisfying entirely sportsmen's necessities. It is admitted by all that function disorders nutritionists, representing the permanent exchange of information, energy and substance represents almost as the breath, the closest connection between the human body and its environment, and in these sports performance specific conditions, this link should be as more appropriate (Gheorghe D., 2002).

Glucose biosynthesis ability is very important for most organizations and especially physical effort. Essence of glycolysis consists in obtaining power, the stages where the transfer is maximum power are those of hexokinază, fosfofructokinază catalizate and piruvatkinază. These stages are characterized by a large degree of - irreversibility, bound by the strong exegenous process (- 74 kJ/mol), and in the overall process of glucose biosynthesis are replaced with other reactions coupled enegetic with energy sources. The two processes must be adjusted in a way, exclusive, in the sense that when glycolysis is active, gluconeogenesis is inhibited and reverse. These two reasons explain the existence of the set of reactions common to both ways. These are the reactions that happen in the vicinity so that equilibrium is characterized by reversibility (Koolman J., and Roehm K. H, 2005).

The role of carbohydrates in the nourishment of the sportsman

Valued quantity body sugars is only 0.3% of the body weight (in absolute value, approximately 0,2 kg), their importance is very great, having a double role: energy and structural (Buchanan L., 2005; Nica-Badea D., 2011).

They are indispensable because of the functions in the body.

- Role of energy, because energy derived by oxidation, part of this energy via ATP-contracției muscle support is his. In the carbohydrate formed the reserve of energy to the body, while 50-60% of the energy of the body, especially muscle activity.
- The primary energy source for the central nervous system (CNS).
- The antitoxic function of the liver by the glycogen reserves in the detoxication of the organism after effort. Increase the body resistance to toxic substances. Through their presence ensures the proper functioning of the liver and a toning. Dietary fiber in the form of action of removing toxins from the intestines.

- plastic role through the synthesis of amino acids from the protein composition of cell growth and tissue recovery.
- Catalytic role in lipid metabolism mechanism. By ensuring their optimum in the diet is protein protects and ensures the complete degradation of lipids.
- Body thermoregulation.

Research on performance in sports, underlined the appearance that a modern sportsman is not only put submissively under an increased muscular effort, but also under, an intense effort, which requires the neuropsihic entry which enquires the involvement of all the biologycal and fizilogycal mechanisms. The lost nutrients enssuring capableof replacing the muscular substantial loss is far from satisfying entirely sportsmen's necessities. It was found that athletes are tempted to use chemicals called ergogene, which could influence a positive driving force, their qualities, the ability to workout, recovery after effort and body composition (Damian S., 2006). The interconnection between the driving characteristics of groups of disciplines and nutritional components of basic food is revealed in Table no. 1

The basic component of a modern athlete is his/her native talent, as well as other random factors such as: effective and constant training, psychological and cognitive components, resistance to injury and an adequate food support. In the practice of sports, nutrition is a special component in the sense that the foods selected by the athlete can contribute to success or failure. Experience has shown that a well chosen diet may not turn an unknown person into a champion, if he/ she doesn't have the proper talent and motivation for performing but an inappropriate diet may become an impediment for a talented athlete who wants to reach the top (Maughan R., et al., 2004).

Use of carbohydrates during effort brings very good results which, in certain conditions, be materialized in significant sporting performances. These favourable effects can explain the positive impact whereas you are eating carbohydrates in effort on appearance, intensity, but also the fact that fatigue is caused by the reducing of the glycogen muscular level, the prevention of settling hypoglycemia, reducing the overall rate of carbohydrates oxidation. In order to assess how the carbohydrates could be used to drop the use of glycogen in the muscle you need to take in account the absorption of carbohydrates during the physical effort compared to the percentage of glucose (endogenous and exogenous) in blood. Carbohydrates absorption mechanisms have been elucidated studying various types of effort (constantly effort, effort with an self-imposed rythm, supramaximal effort type all out) and represents the main elements of the management protocol, which you need to keep in mind to maximize your performance plan. Eating carbohydrates during physical exercise in clearly leads to theimprovement of the sports performance by reducing the use of muscular glycogen results from stimulation of the muscle glycogenogenesis, the prevention of settling hypoglycemia, reducing the overall rate of carbohydrates oxidation (Coggan, A.R. & Coyle, E.F., 1991).

Table 1. Summary of the characteristics of the driving, the main elements in nutrition and food, particularly the various groups of disciplines (Rinderu., 2005).

Groups of disciplines	**Driving features**	**Nutritional elements main**	**The main Nutritional elements CHO - Fat – Protein**
Disciplines resistance	Resistance	A content-rich Glycogen, increased percentage of carbohydrates	60- 25-15
Disciplines resistance force	Synthesis of force and resistance (ongoing effort extended by force)	High content of carbohydrates and proteins	56-26-17
Disciplines Wrestling	Maximum force, strength, speed, stamina, force (effort extended intervals)	Need for increased protein and carbohydrates Note: the proportion of lipids increases due to protein	50-30-20
Sports collective	Speed, speed, force-strength and coordination (effort extended intervals)	Repeated exercises speed, speed, force-fosfați, carbohydrate compounds. For force-intake additional protein.	54-28-18
Sports force-velocity	Force-velocity, force maximum strength strength (short-term exercises)	Need for increased protein	52-30-18
Force sports	Maximum strength, strength-speed, coordination (e.g. very brief)	Need very high protein and increasing proportion in consequence of fat	42-36-22
Other disciplines	Profile of motric capacity less developed	Foods rich in carbohydrates and protein; low in fat	56-28-16

Mouth - brain connection

It can be motivated that by eating carbohydrates influences the brain and is proved that the taste influences the well-being mood and can also influence how we perceive the effort which we are going to do, this representing a real support for the central nervous system (Carter J.M., Jeukendrup A.E., & Jones DA., 2004.). To show if there is a relationship between increased brain activity and ingesting carbs were scanning experiments using fMRI technique-(Chambers E. S., Bridge MV., and Jones DA., 2009). It's demonsyrated that this study highlights that a carbohydrate solution produces several brain areas activation such as the activation of the reward center, involved in motor control areas (fig. 1)

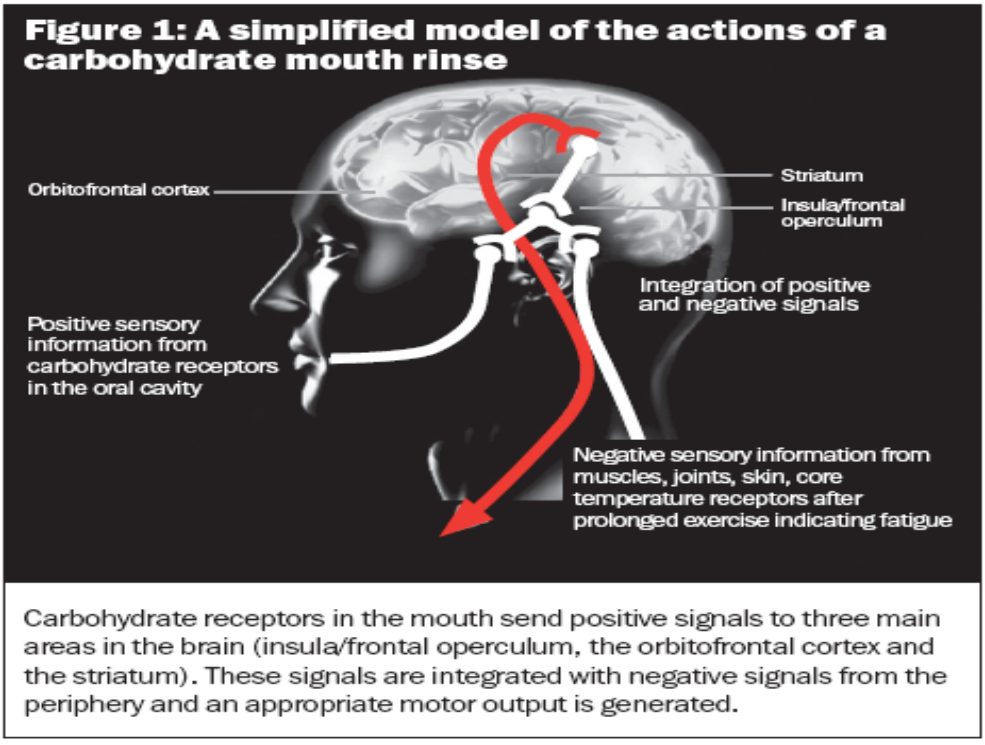

Fig. 1. Model of buccal cavity-brain receptors (Chambers E. S, 2005)

During exercises at the level of the sternum many signals from muscles, joints, skin, lungs, temperature receptors are sent to the brain. After a while these signals are perceived as unpleasant in consciously or unconsciously that leads to inhibition of the motor. It is assumed that in this activity are involved receptors of carbohydrates inhibitory activity.

Carbohydrate supplementation and evaluation of performance since

The 1980s and until today many studies have demonstrated the role of supplementation in organic carbohydrate performance for drills lasting 2 hours and more (Jeukendrup A., 2004; Jeukendrup A., 2008). The explanation could be the prevention of the hipoglycemya and probably more important is maintaining a high ratio of oxidation of carbohydrates for maintaining a high rate of effort. Studies on dosage-answer report does not offer a clear answer though recent recommendations set a rate of 30-60 g/h, based on the observation that the ingestion of carbohydrates oxidation not may be subject to a rate of more than 60 g/h (Sallis, Robert E., 2007). Recently shown to synergistically role combinations: alunor with fructose sugar that produces a high rate of oxidation/h equivalent 105 g (Jentjens RL., & Jeukendrup A.E., 2005). On the role of experience and

strong performance with fructose glucose mixture in the ratio of 2: 1 indicates increase in performance by 8% compared to glucose and 17% as compared with the placebo effect (Currell K., & Jeukendrup A.E. 2010). Such effects are applied when ingested on average 90 g/h. these results are summarized in table 2.

Table 2. Recomsnded carbohydrate intake (CHO) during exercise in order to optimisse performance

Exercise duration	**CHO needed**	**CHO intake**	**Comments**
15-45 min	Very small amounts of CHO		
45 min-2h	Small amounts of CHO	Up to 30g/h	Can be achieved with most forms of CHO
1.5-3h	Moderate amounts of CHO	Up to 60g/h	Can be achieved with CHO that are rapidly oxidised (glucose, maltodextrins)
>2.5h	Large amounts of CHO	Up to 90g/h	Can only be achieved by intakes of multiple transportable CHO (glucose:fructose; maltodextrin:fructose)

Sugars consumed influence the sports performance and especially physical effort producing different effects of which we mention:

a) The reduction results from the muscle by using the carbohydrates in the effort. It was found with savings up to 25% of the muscular glycogen in infusion solutions, but also in the case of administration the liquids on the digestive way, when an important part of the oxidative metabolism of the active muscles, has come to rely on the use of exogenous glucose. And this may explain the fact that when you manage carbohydrate during exercise, when physical muscular depletion the muscular glycogen can still the value in excess of 250 mmol/Kg dry muscles under the normal level of about being stationary 590 mmol/Kg dry muscles. Here it may be concluded that in such situations, physical exhaustion, however, is due to factors other than draining the tanks of muscle glycogen (Brouns F., Saris W.H.M. Beckers E. et al.1989). And yet the consumption of carbohydrates in the effort, significant remits the use the muscular glycogen only: if the initial levels of glycogen in the muscle are normal or reduced, so, if you do not set immediately before starting the effort does not have carbohydrates or sugars used in the effort are sufficient quantity (minimum 50 g in total) and if the intensity of effort is small or variable. Another important aspect to be kept in mind is the type of carbohydrates you administer, for example is proved that glucose remits the use of glycogen more effectively than galactose. (Leijssen D.P.C., Saris W.H.M., Jeukendrup A.E., et al. 1995).

b) Simultaneous synthesis of glycogen takes effect as a result of administration of carbohydrate in the effort.

It was shown that could be carried out, the remiting of muscular glycogen by administering carbohydrates along with the synthesis of glycogen, which takes place in active muscles or even during exercise. The other side is quite a number of authors, which looks like the ingestion of carbohydrates in effort not to influence the rate of muscle use results from, nor the postponing of the fatigue. They suggest that, in fact, only in a 50% of VO2max intensity case glucose used into the effort is consumed and might be used in the muscles activity instead of its own glycogen. Other authors (Brouns F., 1994; Noakes T.D., 1991) claim that the glucose administrated during the effort managed during that glucose does not reduce the rate of utilization effort results from muscle, and that rather it is used by muscles instead of glucose by the liver. So that would mean glucose or other ingested carbohydrates, can do to save only the glycogen of the liver and uninvolved muscle groups in the effort (Brouns F., 1992). For example: in the case of participants in the tour de France cycling was found that the glycogenogenesis average in the effort is 21 mmol/Kg/h of dry muscle (limits: 0-35) under a substantial intake of carbs and at the same time. This represents a significant value, if you compare it with that of a 37 mmol/Kg/h of dry muscle (limits: 27-52), found on the same subjects in sleep. (Kuipers H., Keizer H.A., Brouns F., et al.,1987). It looks like the synthesis of glycogen in the muscle that takes place under the concurrent provision of moderate exercise (40% of maximum watt), dormant muscle fibers affect preferential (Kuipers, H., Saris, W.H.M., Brouns, F. et al., 1989). It was found that the unschooled athletes muscles are unable to achieve a net gain of glycogen in the exertion of maximum 40% of the watt, even under the administration of very concentrated solutions; for example 25% (ibid). There even arise some questions connected tothe mechanism which makes possible the molecular glycogen synthesys for the cyclists. From accomplished studies it would seem like that the activating of phosphorylatekinase b, which takes place in time for the effort, may be reversed when it extended, thereby creating the favourable conditions for glycogenogenesis.

c) The appearance and use of sanguine glucose in the blood as a result of ingestion of the carbohydrates during the effort.

The carbohydrate ingested at the same time within the disuse of the molecular glycogen, influence the appearance and use of sanguine glucose in effort and thus become a global rate of augmentation of glucose in the blood, concomitant with our significant growth of its exogenous component (Bosch, A.N., Dennis, S.C., & Noakes, T.D., 1994; Rauch, L.H.G., Hawley, J.A., Noakes, T.D. et al1., 1996) and reducing endogenous participation component to drastic moisture reduction (Howlett, K., Angus, D., Proietto, J. et al., 1998). In this way increases significantly the contribution of carbohydrates, in theframe of total energy consumed in the effort. According to some authors (Costill D. L., Bennett, T., Branham, G. et al., 1973; Röcker, K., Krieg, B., Niess, A., et al. 1996), time of start of the use of exogenous glucose by muscles is very early, and it's placed in the first 5-7-10 minutes after first ingestion. Other authors (Pirnay F.,

Scheen A.J., Gautier J.F., et al. 1995) considered as though the moment is more tardy, respectively. 30 minutes after first ingestion. The activity and performance of the sportsman materializad in victory which would have beyond statistics, can answer to a large number of nuanced questions and varied dilemmas, through well-thought training and strictly individualized programmes. (Dumitru Gh., 2002).

Performance evaluation of spotive during physical effort in terms of the utilization of carbohydrates is accomplished taking into account:

a) the duration of the provision of a constant effort;
b) performance obtained in efforts with rhythm autoimpus/type countdown;
c) performance obtained in efforts „ all aut ".

a) In conditions in which the duration of the provision of an effort is constant, then according to the specialized studies the carbohydrate consumption during substantial effort has ergogenic effects that are considerably reflected in sport performance which substantially beyond the effort. For example: in order to get results, the average rate of consumption of carbohydrates must be 0,8 g/min, or slightly over; this means, for example, to ingest carbohydrates 240 ml of solution 5% or 10% 120 ml every 15 minutes (Coyle E.F., 1988). Factors influencing the favourable effect of the disorders in sports performance are intensity physical effort (only occurs if the benefit effort reduced intensity and especially durable, i.e. If the efforts of up to 75% of VO2max) (Chryssanthopoulos C., & Williams C., 1997), the dosage and form of carbohydrates use but also on the level of the initial results from the muscle.

b) Studies of performance for self- impossed rythm effort require the athletes to keep cycling effort which would become nearer of the effort of cycling races, but achieving such protocols is however conditioned by possession of special ergometrice bikes. For example: the use of carbohydrates improves performance in effort only when the initial levels of muscular glycogen are normal or low, but not when they are overcompensating. This fact is valid both for a stimulated countdown race on the distance of 40 Km (Jeukendrup A., Brouns F., Wagenmakers A.J.M. et al., 1997) and for efforts that last up to 120 minutes (Widrick J.J., Costill D. L., Fink, W.J. et al. 1993), 120 minutes or over 120 minutes. (Madsen K., Kiens D.A., MacLean B., et al., 1996). The use of carbohydrates improves performance in effort only when the initial levels of muscle results are normal or reduced and hence result in great importance, because many times, very competitive due to the loaded programme and sometimes from ignorance, regarding dietary matters, athletes fail to be present at the contest with the overcompensated reserves of glycogen.

c) Performance of type efforts, „all out" in case of using carbohydrates during the effort which precede its end clearly pleads highlights a significant advantage of the carbohydrates with a lower glycemic index disorders lower compared to those with high glycemic index. By effort type, „all out" means a request type, done up to supramaximal exhaustion, and most of the research effort, „all out", is set in position of finish, meaning after the provision of other efforts, typically submaximal ones, for a shorter or a longer period of time.

Conclusions

Glucose biosynthesis ability is very important for most organisms and especially in physical effort. It was found that athletes are tempted to use some chemicals called ergogens, which could conduct to a positive driving force the motric qualities, the ability to workout, the recovery after effort and the body composition. Recent studies have demonstrate the carbohydrate action in some cerebral areas activation as the reward centre or implied areas in motive control

In the practice of sports, nutrition is a special component in the sense that the foods selected by the athlet can contribute to success or failure. Yet during the 1980s and until today many studies have demonstrated the role of carbohydrate supplementation for drills lasting 2 hours and more. The carbohydrate absorption mechanisms have been elucidated in various types of effort (constant effort, self- impossed rythm effort, supramaximal effort-type all out) and represents the main elements of the management protocol, which you need to keep in mind to maximize the gains in the performance plan.

In the case of using the carbohydrates during the effort which precedes its end, cleary for a significant advantage of the carbohydrates with a lower glycemic index comparative with those with a higher glycemic index.

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SUPPLEMENTATION WITH AN ANTIOXIDANT COMPLEX AND THE EFFORT CAPACITY OF ATHLETES

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ABSTRACT. *Introduction*. Protection from the oxidative stress induced by physical effort can be ensured by the antioxidants in the diet and the supplementation with different preparations with antioxidant ingredients. We chose a preparation with a complex formula of antioxidants: vitamins, fruit and herb extracts, patented licopene, grape and olive extracts. *Aims*. The effect of supplementation with an antioxidant complex on the physical effort capacity of athletes was studied. *Methods*. The groups were divided as follows: group I – athletes supplemented with AO, group II – athletes not supplemented with AO, group III – controls supplemented with AO, group IV – controls. The aerobic effort capacity was evaluated with the help of the Astrand-Ryhming cycle ergometer test, and the anaerobic effort capacity was evaluated with the help of the Sargent vertical jump test. *Results*. After 28 days of supplementation with antioxidants significant modifications were found of the aerobic effort capacity in athletes and sedentary people and non-significant modifications of the anaerobic effort capacity in athletes and sedentary people ($p<0.005$). *Conclusions*. Supplementation with antioxidants determines significant increases of the aerobic effort capacity in athletes and sedentary people, but does not determine significant modifications of the anaerobic effort capacity in athletes and sedentary people.

Key words: physical effort, antioxidants, athletes.

REZUMAT. Suplimentarea cu un complex antioxidant şi capacitatea de efort la sportive. *Premize*. Protecţia faţă de stresul oxidativ indus de efortul fizic poate fi asigurată prin antioxidanţii din dietă şi prin suplimentarea cu diferite preparate cu ingredienţi antioxidanţi. Am ales un preparat cu o formulă complexă de antioxidanţi: vitamine, extracte din fructe şi plante medicinale, extracte patentate de licopin, struguri şi măsline. *Obiective*. S-a urmărit efectul suplimentării cu un complex antioxidant asupra capacităţii de efort fizic la sportivi. *Metode*. Loturile s-au împărţit astfel: lotul I - sportivi suplimentaţi cu AO, lotul II - sportivi nesuplimenţati cu AO, lotul III - martori suplimentaţi cu AO, lotul IV - martori. Capacitatea aerobă de efort s-a evaluat cu ajutorul testului Astrand-Ryhming la cicloergometru, iar capacitatea anaerobă de efort s-a evaluat cu ajutorul testului Sargent de săritură pe verticală. *Rezultate*. După 28 de zile de suplimentare cu antioxidanţi s-au constatat modificări semnificative ale capacităţii aerobe de efort la sportivi şi sedentari şi modificări nesemnificative ale capacităţii anaerobe de efort la

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sportivi şi sedentari (p<0.005). *Concluzii*. Suplimentarea cu antioxidanţi determină creşteri semnificative ale capacităţii aerobe de efort la sportivi şi sedentari, însă nu determină modificări semnificative ale capacităţii anaerobe de efort la sportivi şi sedentari.

Cuvinte cheie: efort fizic, antioxidanţi, sportivi.

Introduction

The increase of the production of reactive species of oxygen (SRO) and of nitrogen (SRN) in the aerobic effort is the consequence of the increased consumption of O2. If the forming of reactive species of oxygen and nitrogen (SRON) exceeds the body's antioxidant capacity (AO), then oxy-nitrosative stress (SON) is produced, with the oxidation of lipids, proteins and desoxyribonucleic acid (DNA) (Bloomer, 2008; Davison & al, 2012; Preiser, 2012). The increase of SON may induce lesions of the cellular structures and tissue dysfunctions. Increases of SON take place both in physiological conditions, such as physical effort, aging, gestation, as well as in pathological conditions, such as cancer, diabetes, intoxications, neurodegenerative, cardiovascular and inflammatory diseases. Most of the times, prevention by endogenous antioxidants is inefficient. Protection from SON may be increased by AO in diet and supplementation with different preparations with AO ingredients (Dejica, 2001; Tache, 2001) which, in effort conditions, may contribute to the supporting of the effort and the increasing of the performances, as well as to the post-effort recovery.

Aims

The effect of supplementation with an antioxidant complex on the aerobic and anaerobic effort capacity of athletes was studied

Material and methods

The research was carried out at the Sports Polyclinic of Cluj-Napoca, during the period 05.01.2012-02.02.2012, on 4 groups of subjects, out of which 2 groups of professional athletes, practicing basketball, with an experience of at least 10 years in sports and 2 groups of students of the Faculty of Physical Education and Sports, within "Babes-Bolyai" University of Cluj-Napoca, not practicing professional sports, at the end of their 1st university semester. The subjects in groups I and III were given a complex of antioxidants called Antioxidant Optimizer^{R}, in amount of 3 tablets/day, representing the dose recommended by the manufacturing company Jarrow Formulas. The selection criteria of the subjects participating in the study were: gender (male), age (between 20-35 years), height (>= 175 cm), weight (70<G<115), body mass index within normal limits (20<BMI <26) and the percentage of fat tissue (FT<20%). The research was carried

out with the informed consent of each participant in the study and with the approval of the Ethics Committee of the "Iuliu Haţieganu" University of Medicine and Pharmacy from Cluj-Napoca.

a. The groups taken into study (n=10/group):
Group I : Athletes supplemented with AO (n.=10)
Group II : Athletes not supplemented with AO (n.=10)
Group III : Controls supplemented with AO (n.=10)
Group IV : Controls (n.=10)

b. Moments taken into study: T0 – first day; T28 – day 29.

c. The anthropometric indices were obtained:
- directly: by the measuring of the weight (G) expressed in kilograms (kg), with the help of the weighing scale, by the measuring of the height (H) expressed in meters (m), with the help of the height meter and by the measuring of 5 plies of fat tissue (tricipital, scapular, flank, abdomen and thigh) expressed in millimeters (mm), with the help of the fat meter.
- indirectly: by the calculation of the body mass index (BMI) expressed in kg/m2, by the application of the formula BMI=G/H2 and by the calculation of the percentage of fat tissue (FT%) with the help of the formula FT%=(The sum of the 5 plies of fat tissue) x 0.15 + 5.8 + body surface; the body surface was also obtained indirectly, with the help of the Dubois-Reymond nomogram, according to weight and height.

d. The aerobic effort capacity (ARC%) was evaluated with the help of the Astrand-Ryhming test, by the carrying out of a 6 minute sub maximal effort at the cycle ergometer with the rotation of 60/minute, with a load of 2.2 W/kg body, maintained constant for the entire duration of the test. Thus the maximum oxygen consumption in absolute value was obtained (VO2 max), expressed in ml/min. The unit value of VO2 max (VO2 max/G) was compared to the ideal unit value of VO2 max, obtained by the following calculation: 110- 0.4xG. According to the value of the percentage obtained, the aerobic effort capacity was assessed (Ionescu In Drăgan, 2002). The values were expressed in percents.

e. The anaerobic effort capacity was evaluated with the help of the Sargent vertical jump test (Sargent, 1921) by which take-off (jump) was determined (J). Then the average anaerobic power was calculated, by the application of the Johnson-Bahamonde formula (Johnson and Bahamonde, 1996): The average anaerobic power (AANP) (W) = 43.8 x J (cm) + 32.7 x G (kg) -16.8 x H (cm) + 431

f. The statistical calculations were made with the help of the SPSS 13.0 and Microsoft EXCEL applications. The significance threshold was set for $p<0.01$.

Results

a. The statistical analysis in groups, between the moments T0 and T28 (Tables 1, 2, 3, 4).

Table 1. Descriptive and comparative statistical analysis of the indicators studied, between the moments T0 and T28, for group I.

Indicators	Moment T0		Moment T28		p
	Mean	Std.Deviation	Mean	Std.Deviation	
BMI	25.09	1.813	24.46	1.75	0.551
FT	15.422	2.071	13.017	4.939	**0.005**
ARC	85.08	5.15	92.94	3.33	**0.004**
AANP	2562.90	231.053	2773.89	197.86	**0.003**

For group I significant variations of the FT, ARC and AANP are observed and non-significant variations of the BMI, between the moments T0 and T28.

Table 2. The comparison of the indicators studied, between moments T0 and T28, for group II.

Indicators	Moment T0		Moment T28		p
	Mean	Std.Deviation	Mean	Std.Deviation	
BMI	23.93	0.926	23.73	0.882	0.2
FT	14.692	1.32	14.532	1.291	0.2
ARC	80.76	8.52	84.34	7.98	**0.008**
AANP	2394.11	257.497	2579.889	332.552	**0.008**

For group II non-significant variations of the BMI and FT are observed and significant variations of the ARC and AANP between the moments T0 and T28.

In the case of group II, after 28 days of training, without supplementation with antioxidant complex, non-significant decreases of the BMI and FT are recorded. ARC and AANP increase significantly after 28 days of training, without supplementation with antioxidant complex.

Table 3. The comparison of the indicators studied, between moments T0 and T28, for group III.

Indicators	Moment T0		Moment T28		p
	Mean	Std.Deviation	Mean	Std.Deviation	
BMI	25.28	1.134	24.99	0.858	0.49
FT	14.501	1.188	13.895	1.001	**0.000**
ARC	70.95	7.93	78.84	6.95	**0.004**
AANP	1885.50	227.653	1924.40	282.109	0.251

For group III significant variations are noticed of the FT and ARC and non-significant variations of the BMI and AANP, between the moments T0 and T28.

In the case of group III, after 28 days of supplementation with an antioxidant complex, without training, a non-significant decrease of the BMI and a significant decrease of the FT are recorded. ARC increases significantly, in exchange the increase of AANP is non-significant, after 28 days of supplementation with antioxidant complex, without training.

Table 4. The comparison of the indicators studied, between moments T0 and T28, for group IV.

Indicators	Moment T0		Moment T28		p
	Mean	Std.Deviation	Mean	Std.Deviation	
BMI	24.50	1.541	24.56	1.619	0.452
FT	16.997	1.254	16.727	0.905	0.181
ARC	63.01	7.83	64.797	7.52	0.08
AANP	1883.40	181.033	1912	232.302	0.35

For group IV non-significant variations are noticed of the BMI, FT, ARC and AANP, between the moments T0 and T28.

In the case of group IV, after 28 days without supplementation with an antioxidant complex and without training, a non-significant increase of the BMI and a non-significant decrease of the FT are recorded. ARC and AANP increase non-significantly after 28 days without supplementation with antioxidant complex, without training.

b. Statistical analysis according to moments, between the groups.

Table 5. Descriptive and comparative statistical analysis of the indicators studied, at the moment T0

Indicators	Groups	Mean	Std.Deviation	p
BMI(kg/m2)	I	25.09	1.81	I-II=0.429; I-III=0.9; I-IV=0.9
	II	23.93	0.92	
	III	25.28	1.13	II-III=0.225; II-IV=0.9; III-IV=0.9
	IV	24.50	1.54	
FT (%)	I	15.42	2.07	I-II=0.5; **I-III=0.000**; **I-IV=0.000**;
	II	14.69	1.32	
	III	14.50	1.18	II-III=0.9; **II-IV=0.001**; **III-IV=0.000**.
	IV	16.99	1.25	
ARC (%)	I	85.08	5.15	I-II=0.4; **I-III=0.000**; **I-IV=0.000**;
	II	80.76	8.52	
	III	70.95	7.93	**II-III=0.008**; **II-IV=0.001**; III-IV=0.02
	IV	63.01	7.83	
AANP (W)	I	2562.90	231.05	I-II=0.503; **I-III=0.000**; **I-IV=0.000**;
	II	2394	257.49	
	III	1885.50	227.65	**II-III=0.000**; **II-IV=0.000**; III-IV=0.9
	IV	1883.40	181.03	

At the moment T0 there are no significant differences concerning the BMI between the groups.

At the moment T0 there are significant differences concerning the FT between the groups I and III, I and IV, II and IV, III and IV.

At the moment T0 there are significant differences concerning the ARC between the groups I and III, I and IV, II and III, II and IV.

At the moment T0 there are significant differences concerning the AANP between the groups I and III, I and IV, II and III, II and I

Table 6. Descriptive and comparative statistical analysis of the indicators studied, at the moment T28

Indicators	Groups	Mean	Std.Deviation	p
BMI(kg/m2)	I	24.46	1.75	I-II=0.4;I-III=0.9;I-IV=0.9; II-III=0.3;II-IV=0.4;III-IV=0.9
	II	23.73	0.88	
	III	24.99	0.85	
	IV	24.56	1.61	
FT (%)	I	13.01	4.93	**I-II=0.001**; I-III=0.5; **I-IV=0.001**; II-III=0.2;**II-IV=0.000**;**III-IV=0.000**
	II	14.53	1.29	
	III	13.89	1.00	
	IV	16.72	0.90	
ARC (%)	I	92.94	3.33	**I-II=0.004**; **I-III=0.002**; **I-IV=0.002**; II-III=0.027;**II-IV=0.005**; **III-IV=0.002**
	II	84.34	7.98	
	III	78.84	6.95	
	IV	64.79	7.52	
AANP (W)	I	2773.89	197.86	I-II=0.495;**I-III=0.000**; **I-IV=0.000**; **II-III=0.000**;**II-IV=0.000**; III-IV=0.9
	II	2579.88	332.55	
	III	1924.40	282.10	
	IV	1912.00	232.30	

At the moment T28, there are no significant differences concerning the BMI between the groups.

At the moment T28 there are significant differences concerning the FT between the groups I and II, I and IV, II and IV, III and IV.

At the moment T28 there are significant differences concerning the ARC between the groups I and II, I and III, I and IV, II and IV, III and IV.

At the moment T28 there are significant differences concerning the AANP between the groups I and III, I and IV, II and III, II and IV.

Discussions

In the case of group I, after 28 days of training and supplementation with an antioxidant complex, a non-significant decrease of the BMI and a significant decrease of the FT are found. ARC and AANP increase significantly after 28 days of training and supplementation with antioxidant complex.

In the case of group II, after 28 days of training, without supplementation with an antioxidant complex, non-significant decreases of the BMI and FT are found. ARC and AANP increase significantly after 28 days of training, without supplementation with antioxidant complex.

In the case of group III, after 28 days of supplementation with an antioxidant complex, without training, a non-significant decrease of the BMI and a significant decrease of the FT are found. ARC increases significantly, but the increase of the AANP is non-significant, after 28 days of supplementation with antioxidant complex, without training.

In the case of group IV, after 28 days without supplementation with an antioxidant complex and without training, a non-significant increase of the BMI and a non-significant decrease of the FT are found. ARC and AANP increase non-significantly after 28 days without supplementation with antioxidant complex, without training.

Our results show that the supplementation for 28 days with AO determines in athletes (Group I) significant increases of the ARC as compared to the non-supplemented athletes (Group III) and the controls.

We chose a preparation with a complex AO formula: vitamins, fruit and herb extracts, patented licopene, grape and olive extracts.

The product Antioxidant Optimizer^{R} is 20 times more efficient than vitamin C and 300 times more efficient than vitamin E. It contains (composition/ 3 tablets): Vitamin C (250 mg), Vitamin E (100 mg), Lutein (5 mg), Licopene (2 mg), Grapes – seed extract, 95% polyphenols (50 mg) and peel extract, 25% polyphenols (150 mg), milk thistle (80 mg), olive – fruit extract (30 mg), green tea (250 mg), curcumin (300 mg), ginger (200 mg) (xxx).

Vitamin C acts quickly in peroxyl radicals, $^{1}O_2$, superoxide ($O_2^{-\bullet}$), $OH^{\bullet}$ and maintains the reserves of vitamin E and β-carotene, but in large doses, may hinder some cellular adaptations to physical effort (Gomez-Cabrera et al, 2008; Yfani et al, 2010).

Vitamin E is a fat-soluble AO from the cellular membrane, acting as a protector against lipid peroxidation (Naziroglu et al, 2010); it is efficient in the stabilization of polyunsaturated fatty acids (PUFA) against self-oxidation and purifies $^{1}O_2$ at the level of the biomembranes (Ciocoiu et al, 2007).

Lutein is a carotenoid which efficiently hinders the peroxidation of seric lipids.

Licopene acts as an AO – singlet extinguisher O_2 ($^{1}O_2$), protecting the muscular tissue after exhausting effort (Liu et al, 2005).

Milk thistle, extracted from *Silybum marianum* seeds, is an AO which is 10 times stronger than vitamin E, contributing to the chelation of Fe in excess from the tissues (Asghar et al, 2008).

Polyphenols are direct and indirect AO– purifiers for the hydroxyl radical ($OH^{\bullet}$), having a protective role against muscle lesions by contractions with strains (Davis et al, 2010; Morillas-Ruiz et al, 2006).

The olive fruit extract contains polyphenols, flavonoids, flavonols, carotenoids, with AO and energizing role.

Green tea contains 50% polyphenols and is an H_2O_2 purifier and inhibitor of the generation of 8-hydroxydeoxyguanosine (8-OH-dG). It offers protection against oxidative stress induced by the physical effort in the untrained subjects (Jowko et al, 2011), while in the case of athletes additional studies are necessary (Dean et al, 2009; Eichenberger et al, 2010).

Curcumin is a 300 times more powerful AO than vitamin E, it protects the DNA from SRO, it inhibits lipid peroxidation (Mohammadi et al, 2012).
Ginger has an inhibiting effect on lipid peroxidation (Ramadan et al, 2011).

The research carried out on high performance athletes in different fields, such as cross country running (Di Giacomo & al, 2009; Mastaloudis & al, 2006; Watson & al, 2005), cycling (Morillas-Ruiz & al, 2005), football (Andersson & al, 2010; Arent & al, 2010), kayaking (Teixeira & al, 2009) highlighted the fact that the supplementation with AO does not limit the lipid oxidation induced by the physical effort. (Lamprecht & al, 2009; Teixeira & al, 2009). Most of the research carried out until now proved the fact that moderate physical effort increases the defense capacity of the body against (SON) (Mignini & al, 2008; Tache & al, 2009). The necessity of supplementing with AO in the case of athletes was questioned by some authors (Peternelj & Coombes, 2011; Powers & al, 2011), while others, more recently, concluded that new research is necessary to establish if and in what conditions the supplementation with AO is beneficial to athletes (Hernandez & al, 2012; Veskoukis & al, 2012). Physical effort in basketball develops at maximum intensity which alternates with short periods of submaximal intensity and needs combined physical qualities (Baroga în Drăgan, 2002) and multiple mental qualities.

Our research recommends an adequate and varied infusion of antioxidants in the diet, to maintain redox homeostasis in effort, according to the intensity of the physical effort performed.

Conclusions

1. The administration of the antioxidant complex for 28 days determines the increase of the aerobic effort capacity in athletes and sedentary people.
2. The administration of the antioxidant complex for 28 days does not determine significant modifications of the anaerobic effort capacity in athletes and sedentary people.
3. The increase of the aerobic effort capacity may be attributed to the favourable effects of the antioxidant complex.

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OXIDANT/ANTIOXIDANT BALANCE IN CARNITINE SUPPLEMENTED RATS EXPOSED TO CHRONIC IMMOBILIZATION STRESS

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ABSTRACT. *Background.* Immobilization is a commonly used anakinetic procedure in orthopedics. Immobilization/restraint stress is an easy and convenient method to induce both psychological and physical stress as animal models for stress. L-Carnitine is a natural substance required in the energetic metabolism of the mammals, which is also known for its antioxidant function. The *aim* of the present study was to evaluate the effect of chronic immobilization stress on oxidant/antioxidant balance in the serum and tissues, (liver and muscle), on rats with and without carnitine supplementation. *Materials and methods.* Rats were divided randomly into four groups of ten rats each: control group (I); immobilization stress (II); supplemented with carnitine (III); supplemented with carnitine and exposed to immobilization stress (IV). *Results and conclusions.* Our experimental results show that chronic immobilization stress increases the oxidative stress (OS) indicators in serum and tissues and decreases those of antioxidant (AO) defense. Carnitine supplementation in chronic immobilization stress conditions had benefic effects on OS and AO defense indicators, this compound being likely to have favorable effects by diminishing the OS indicators especially in serum, and by increasing the AO defense mainly in tissues (HD and SH).

Keywords: *chronic immobilization stress, oxidants/antioxidants, serum, tissues, carnitine*.

REZUMAT. Balanța oxidanți/antioxidanți la șobolanii suplimentați cu carnitină şi expuşi stresului cronic de imobilizare. *Premize.* Imobilizarea este o procedură anakinetică des utilizată în ortopedie. Stresul de imobilizare/anakinetic este o metodă relativ facilă de inducere atât a stresului psihic, cât şi fizic. Carnitina este o substanță naturală, necesară metabolismului energetic al mamiferelor, dar care este cunoscută şi pentru rolul ei antioxidant. *Obiectivul a*cestui studiu a fost de a evalua efectele stresului cronic de imobilizare asupra balanței oxidanți/antioxidanți în ser şi țesuturi (ficat şi mușchi) la şobolanii suplimentați cu carnitină. *Materiale şi metodă.* Animalele au fost împărțite în 4 loturi a câte 10 animale pe lot: lotul de control (I); lotul supus stresului de imobilizare (II); lotul suplimentat cu carnitină (III); lotul suplimentat cu carnitină şi expus stresului de imobilizare (IV). *Rezultate şi concluzii.* Rezultatele noastre arată că

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stresul cronic de imobilizare a determinat creşterea indicatorilor stresului oxidativ (SO) la nivel seric şi tisular şi scăderea apărării AO. Suplimentarea cu carnitină în condiţii de stres cronic de imobilizare a avut efecte benefice asupra parametrilor SO şi a apărării AO, acest compus dovedindu-şi efectele favorabile prin diminuarea SO în special la nivel seric, şi prin creşterea apărării AO în special la nivel tisular (donorii de hidrogen şi grupările SH).

Cuvinte cheie: *stres cronic de imobilizare, oxidanţi/antioxidanţi, ser, ţesuturi, carnitină*.

Introduction

Immobilization is a commonly used anakinetic procedure in orthopedics. It is performed by keeping still the whole body, or only one member, with or without the use of special equipment, for a variable period of time. Immobilization has both benefic effects on healing of a fracture or adjacent soft tissue, but also negative ones, related to functional impotence of the immobilized limb and adjacent muscle atrophy. A major consequence of postoperative immobilization of orthopedic surgery is rapid onset of skeletal muscle atrophy. Thus, preventing this process, through appropriate anakinetic technique, is a challenge for the doctors (Burta *et al*, 2003).

Immobilization/restraint stress is an easy and convenient method to induce both psychological and physical stress as animal models for stress. As a response to stress factors, several changes occur, such as behavioral, neurochemical and immunological mechanisms with adaptive role (Nayanatara *et al,* 2012):

- musculoskeletal and joint (Chen *et al,* 2005), renal, respiratory, cardiovascular (Nayanatara *et al,* 2012), gastrointestinal (Santos *et al*, 1999), skin, biochemical effects by generating ROS which are directly related to stress intensity (Lata *et al*, 2004), metabolic and endocrine (Cruthirds *et al*, 2011,), neurological and psychological effects (Nayanatara *et al,* 2012).

Carnitine is a quaternary ammonium compound, biosynthesised mainly in the liver and kidney, from the amino acids lysine and methionine. In humans, more than 95% of total content of carnitine can be found in the skeletal muscle (Brass, 1995, Stephens *et al*, 2007). L-Carnitine is a natural substance required in the energetic metabolism of the mammals, which is also known for its antioxidant function (Calò *et al,* 2006, Augustyniak et al, 2009, 2010,).

Aims

The aim of the present study was to evaluate the effect of chronic immobilization stress on oxidant/antioxidant balance in the serum and tissues, (liver and muscle), on rats with and without carnitine supplementation.

Materials and methods

The study was performed on adult male rats, Wistar breed, at the Department of Physiology from UMF "Iuliu Haţieganu", Cluj-Napoca, in the Laboratory of Experimental Physiology. The animal tests and experiments were allowed by the Bioethical Board of the UMF "Iuliu Haţieganu", Cluj-Napoca. The animals were caged in polycarbonate cages, at controlled temperature of 21-22ºC, humidity (40-60%) and 12/12h light/dark cycle. Standard lab chow and water were freely available.

Immobilization stress was applied to the animals for 3 hours daily, for 15 days long, according to the literature data. Immobilization stress was applied to the animals by using cylindrical tubes with dimensions of 15 cms long and 8 cms in diameter, containing numerous perforations which served as breathing holes.

The animals were daily supplemented with L-Carnitine by oropharyngeal gavage, before exposure to stress, (Carnil 100 mg/ml, provided by Anfarm Hellas S.A. Pharmaceutical Industry Factory, Athens, Greece). Each animal received 100 mg/kgc L-Carnitine, calculated according to daily dosage for humans.

Rats were divided randomly into four groups of ten rats each: control group (I), immobilization stress (II), supplemented with carnitine (III), supplemented with carnitine and exposed to immobilization stress (IV).

At the end of the experimental period, blood was collected from the retro orbitary sinus, liver and gastrocnemius muscle were removed immediately. Euthanasia was induced according to the recommendation of the Bioethical Board of the University. Blood samples were immediately centrifuged at 4°C, then plasma was frozen at -20°C and then kept at deep freezer. Tissues were minced and homogenized and the supernatant was used to determine the level and activity of the oxidative stress (OS) indicators – malondialdehyde (MDA) (Conti, 1991) , carbonilated proteins (CP) (Reznick & Packer, 1994) and antioxidant (AO) system –hydrogen donors capacity (HD) (Janaszewska & Bartosz, 2002), thiol groups (SH) (Hu, 1994), reduced gluthatione (GSH) (Hu, 1994).

Statistical analysis. All data are reported as the mean ± SD. Statistical analyses were performed by one-way analysis of variance ANOVA, followed by post hoc Tukey's range test procedure, for pair-wise comparisons. Pearson's correlation was the test of choice, in order to asses the correlation between normally distributed variables. Statistical significance was at $p<0.05$. Statistical values were obtained using GraphPad Prism 5.0 software and Microsoft EXCEL.

Results

The statistical analysis, performed on the 4 groups, revealed that chronic immobilization stress induced significant increases for OS indicators (MDA, CP) in serum of the immobilization stress group (II) as compared to control group (I). The antioxidant defense indicators (HD and SH) in the serum of chronic immobilization stress were lower than in controls. Carnitine supplementation in chronic immobilization stress conditions (group IV) induced significant changes by diminishing the OS indicators and increasing the thiol groups as compared to immobilization stress group (II) (Table 1).

Table 1. Statistical indicators for centrality and dispersion in serum

Lot	**MDA**(nmoli/ml)		**CP**(nmoli/ml)		**HD**(inhib%)		**SH**(μmoli/ml)		**GSH**(nmoli/ml)	
	MA	**±SD**	**MA**	**±SD**	**MA**	**±SD**	**MA**	**±SD**	**MA**	**±SD**
I	2,10	0,20	1,05	0,092	12,81	1,40	0,28	0,027	9,101	0,827
II	2,93[a]	0,25	1,67[a]	0,095	9,94[a]	0,94	0,14[a]	0,017	9,065	0,815
III	2,18	0,19	1,139	0,162	12,21	1,42	0,29	0,025	9,136	0,641
IV	2,49[b]	0,13	1,39[b]	0,154	11,24	1,26	0,25[b]	0,029	8,590	0,945

Note: control group (I), immobilization stress (II), supplemented with carnitine (III), supplemented with carnitine and exposed to immobilization stress (IV).
ANOVA test, $p<0.05$. a= II vs I; b=IV vs II

There were positive correlations between the serum OS indicators, but negative correlations between OS and AO defense indicators (HD and SH). The AO defense indicators (HD and SH) showed a positive correlation (Table 2).

Table 2. Correlation indicators for O/AO balance in serum, at the end of the experiment (n=40)

Parameters		**Pearson Correlation Coefficient**	**p**		**Parameters**		**Pearson Correlation Coefficient**	**p**
MDA	CP	0,72***	**0,0001**		CP	HD	-0,66***	**0,0001**
MDA	HD	-0,66***	**0,0001**		CP	SH	-0,83****	**0,0001**
MDA	SH	-0,76****	**0,0001**		CP	GSH	-0,05*	0,72
MDA	GSH	-0,04*	0,77		HD	SH	0,55***	**0,001**
SH	GSH	0,04*	0,79		HD	GSH	0,18*	0,26

* weak correlation,** acceptable correlation,***good correlation,
**** very good correlation (Colton Scale)

Table 3. Statistical indicators for centrality and dispersion in liver

Lot	**MDA** (nmoli/mg prot)		**CP** (nmoli/mg prot)		**HD** (inhib%)		**SH** (μmoli/mg prot)		**GSH** (nmol/mg prot)	
	MA	**±SD**	**MA**	**±SD**	**MA**	**±SD**	**MA**	**±SD**	**MA**	**±SD**
I	0,08	0,006	1,86	0,15	7,72	0,65	0,04	0,008	5,71	0,56
II	0,14[a]	0,010	5,39[a]	0,52	3,81[a]	0,30	0,025[a]	0,001	3,95[a]	0,38
III	0,09	0,013	2,01	0,24	7,56	0,37	0,039	0,005	5,83	0,54
IV	0,13	0,010	2,92[b]	0,27	5,54[b]	0,52	0,044[b]	0,005	3,58	0,37

Note: control group (I), immobilization stress (II), supplemented with carnitine (III), supplemented with carnitine and exposed to immobilization stress (IV).
ANOVA test, $p<0.05$. a= II vs I; b=IV vs II

Chronic immobilization stress increased the OS and decreased the AO defense indicators in the studied tissues (liver and muscle). Carnitine supplementation revealed protective effects in chronic immobilization stress by reducing the level of muscle MDA, whereas CP were lower in the liver only. Carnitine supplementation increased the levels of AO defense indicators of the chronic immobilization stress, as it follows: HD and SH in both examined tissues (Table 4).

Table 4. Statistical indicators for centrality and dispersion in muscle

Lot	MDA (nmoli/mgprot)		CP (nmoli/mg prot)		HD (inhib%)		SH (μmoli/mg prot)		GSH (nmol/mg prot)	
	MA	**±SD**	**MA**	**±SD**	**MA**	**±SD**	**MA**	**±SD**	**MA**	**±SD**
I	0,57	0,667	3,13	0,26	28,06	2,72	0,027	0,0045	3,25	0,34
II	0,70[a]	0,034	4,66[a]	0,56	12,34[a]	1,38	0,016[a]	0,0024	1,85[a]	1,17
III	0,61	0,055	3,15	0,33	27,87	2,73	0,026	0,0037	2,90	0,31
IV	0,59[b]	0,048	4,80	0,53	27,77[b]	2,38	0,026[b]	0,0039	2,02	0,19

Note: control group (I), immobilization stress (II), supplemented with carnitine (III), supplemented with carnitine and exposed to immobilization stress (IV).
ANOVA test, $p<0.05$. a= II vs I; b=IV vs II

There were positive correlations between the liver OS indicators, but negative correlations between OS and AO defense indicators (MDA/HD, GSH and CP/DH, SH, GSH). The AO defense indicators (HD/SH, GSH) showed a positive correlation (Table 5).

Table 5. Correlation indicators for O/AO balance in liver, at the end of the experiment (n=40)

Parameters		Pearson Correlation Coefficient	p	Parameters		Pearson Correlation Coefficient	p
MDA	CP	0,81****	**0,0001**	CP	HD	-0,92****	**0,0001**
MDA	HD	-0,88****	**0,0001**	CP	SH	-0,66***	**0,0004**
MDA	SH	-0,39**	0,059	CP	GSH	-0,61***	**0,001**
MDA	GSH	-0,79****	**0,0001**	HD	SH	0,46**	**0,02**
SH	GSH	0,15*	0,45	HD	GSH	0,72***	**0,0001**

* weak correlation,** acceptable correlation,***good correlation,
**** very good correlation (Colton Scale)

Pearson correlation coefficient showed negative correlations as it follows: MDA to all AO defense indicators, whereas CP to HD and GSH only. The AO defense indicators were positively correlated one to each other (Table 6).

Table 6. Correlation indicators for O/AO balance in muscle, at the end of the experiment (n=40)

Parameters		Pearson Correlation Coefficient	p	Parameters		Pearson Correlation Coefficient	p
MDA	CP	0,27**	0,19	CP	HD	-0,44**	**0,03**
MDA	HD	-0,59***	**0,002**	CP	SH	-0,34**	0,10
MDA	SH	-0,69***	**0,0001**	CP	GSH	-0,82****	**0,0001**
MDA	GSH	-0,47**	**0,01**	HD	SH	0,74***	**0,0001**
SH	GSH	0,42**	**0,03**	HD	GSH	0,54***	**0,006**
* weak correlation,** acceptable correlation,***good correlation, **** very good correlation (Colton Scale)							

Discussions

Immobilization stress is a relative easy method to induce both mental and physical stress. Immobilization stress is often used either as a model of acute or chronic stress. Stress may influence neurobiological, behavioral and biochemical parameters in several ways. Experimental models developed on immobilized animal showed different changes in the O/AO balance in organs and tissues, changes that dependent on the intensity and exposure time to stress, combined stress factors, gender and age of the subjects (Izgüt-Uysal *et al*, 2007).

Chronic immobilization decreased the fluidity of erythrocyte membranes, increased lipid peroxidation in plasma and erythrocytes, underlining a relationship between the immobilization process and alteration of the O/AO balance in the blood of rabbits (Liu *et al*, 2005) and rats (Chung *et al*, 2010).

In rabbits subjected to chronic immobilization for 3,6,9 weeks long, AO enzyme activities (SOD, CAT and GSH-Px) and OS parameters (NO, MDA) were elevated in serum and synovial fluid, compared with the control group during immobilization (knee joint). This finding sustains the involvement of ROS in cartilage destruction and in the etiopathogenic mechanism of osteoarthritis, thus underlining the necessity of reduced period of immobilization in orthopedic disorders (Erdem *et al*, 2009).

Studies on patients bedridden for long periods of time revealed alterations of GSH/GSSG, increased CuZn-SOD and XO activity. High levels of OS parameters were correlated with muscle atrophy (Liu *et al*, 2005). In humans, like in animals, muscle atrophy, due to reduced activity, is associated with increased CP and impaired AO activity (Dalla Libera *et al*, 2009).

Administration of AO supplements, like vitamins E, C or carnitine may have benefic effects by improving eritrocitary OS indicators in rats exposed to intermittent hypobaric hypoxia conditions (Nadeem *et al*, 2006, Devi *et al*, 2007). Both acute and chronic supplementation of carnitine, had AO effects in moderate physical activity, on

untrained human subjects (Sachan *et al*, 2005, Bloomer *et al*, 2009). Other authors reported low values of plasma carnitine in athletes, without inducing any negative effects on their sportive performance (Metin *et al*, 2003).

Immobilization stress induces both local and systemic changes of the musculoskeletal and circulatory system, brain, liver, stomach, lungs, and myocardium.

Chronic immobilization increased lipid peroxidation in brain, liver, heart and kidney of rats (Nayanatara *et al,* 2012), decreased the activity of antioxidant enzymes CAT, GSH-Px and SOD, GSH, GSH and GSH-ST-R (Zafir & Banu, 2009) in the hippocampus and nucleus striatum of animals (Krolow *et al*, 2010, Ghadrdoost *et al,* 2011) and decreased GSH and CAT activity in liver (Chowdhury *et al*, 2007). In rats, chronic immobilization stress showed elevated MDA and CAT in gastrocnemius and solear muscle (Matsushima *et al*, 2006, Siu *et al*, 2008) increased lipid peroxidation and reduced AO capacity in lymphoid organs (spleen and thymus) (Ganesan *et al*, 2011). In mice, chronic immobilization stress did not affect the lipid peroxidation, but decreased hepatic AO capacity (expressed in decreased GSH-Px 1 and SOD activity) (South *et al*, 2006).

Chronic immobilization, followed by remobilisation, in rabbits, increased lipid peroxidation and decreased GSH levels in plasma and muscle. The changes persisted throughout the whole period of immobilization, but with a maximum at the beginning of remobilization (Liu *et al*, 2005).

Several studies presented the benefic effects of various AO compounds on OS and AO defense indicators. On chronic immobilization stress model, alpha-tocopherol and N-acetylcysteine reduced the MDA values, increased GSH and CAT levels in brain homogenate (Brass, 1995).

Chronic administration of lipoic acid and aminoguanides in cronic immobilized rats decreased the brain and retina TBARS levels and improved the AO activity, CuZnSOD in the brain, and GSH-Px şi CAT in the brain and retina (Akpinar *et al*, 2007, 2008). Antidepressive therapy in cronic immobilized rats, improved the activity of AO enzymes (SOD, CAT, GST, GR, GSH) and decreased the MDA and CP levels (Zafir & Banu, 2009).

Chronic administration of estrogen in male rats chronically immobilized, diminished the muscle atrophic changes and also those related to OS (Cu, Zn-SOD) (Sugiura *et al*, 2006). Vitamin E limited the OS muscle destructions by reducing H_2O_2, the CP and increasing the tissue content of GSH in rats (Venditti *et al,* 2009).

Carnitine supplementation improved muscle capacity to physical exercise based on its` role in the regulation of aerobic metabolism. Moreover, it is also known the role of carnitine in decreasing OS in different pathologies. Carnitine reduced muscle fatigue by lowering muscle ROS, induced by exposure to hypoxia (Dutta *et al*, 2008).

Chronic oral administration of carnitine in animals decreased lipid peroxidation and increased CAT activity in the gastric mucosa, both in blood and tissue (Chowdhury *et al*, 2007), thus reducing the suspension stress effects (Izgüt-Uysal *et al*, 2007).

Conclusions

1. Chronic immobilization intermittent stress determined alterations of oxidant/ antioxidant balance in serum and tissues by increasing the OS and by reducing the AO defense indicators.

2. Carnitine supplementation, in animals exposed to chronic immobilization stress, had benefic effects, by decreasing the OS and improving the AO indicators, in serum and tissues. This compound may have favorable effects by diminishing the OS indicators especially in serum, and by increasing the AO defense mainly in tissues (HD and SH).

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THE EFFECT OF HEMP SEED OIL ON OXIDANT / ANTIOXIDANT BALANCE IN EXERCISE-TRAINED RATS DURING EXERCISE WITH DIFFERENT INTENSITY

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ABSTRACT. ***Background.*** Unfavorable effect of reactive oxygen and nitrogen species production during exercise is increased oxidative stress, decreased antioxidant defense, increased fatigue and decreased performance. Administration of natural antioxidants favorably influence the oxidant/antioxidant balance by improving antioxidative defense. Dietary supplementation with hemp seed oil, obtained by cold pressing, may favorably influence the oxidants/antioxidants balance in exercise in rats due to the high content of vitamin E and polyunsaturated fatty acids omega 3 and omega 6. ***Aims.*** The study investigated the effects of dietary supplementation with hemp seed oil on oxidants/antioxidants balance in physical effort on rats in experimental conditions. ***Methods.*** The research was conducted in nine groups (n = 10 animals / group) of male Wistar adult rats. The groups I-IV comprised rats trained to exercise with different intensity, groups V-VIII included rats trained with different intensity of effort and supplemented with hemp oil; group 0 was control group. In all groups oxidants/antioxidants balance was determined in blood. Training effort lasted 28 days. ***Results.*** The values for oxidative stress indicators increased in all studied groups due to MDA and PC, compared with controls. Antioxidant defense indicator values increased for all indicators studied (GSH, DH, SH) on groups with low intensity exercise with or without oil supplementation. On groups with high intensity effort, DH values decreased and GSH values increased; changes were more pronounced in the groups supplemented with oil. ***Conclusions.*** Exercise of different intensities unfavorably affected O/AO balance. Hemp oil dietary supplementation promotes elevated OS indicators compared with controls and groups without supplementation and favorably influences the AO defense especially on the rise in GSH values.

Key words: rats, hemp oil, exercise, dietary antioxidants, oxidative stress.

REZUMAT. Efectul uleiului din semințe de cânepă asupra balanței oxidanți/ antioxidanți în efortul fizic la şobolani antrenați la efort cu intensitate diferită. ***Premize.*** Efectul nefavorabil al producției de specii reactive ale oxigenului şi azotului în timpul efortului fizic constă în creşterea stresului oxidativ, scăderea apărării antioxidante, creşterea fatigabilității şi scăderea performanței. Administrarea de antioxidanți naturali

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poate influența favorabil balanța oxidanți/antioxidanți, prin îmbunătățirea capacității de apărare antioxidativă. Suplimentarea dietei cu ulei din semințe de cânepă, obținut prin presare la rece, poate influența favorabil balanța oxidanți/antioxidanți în efortul fizic la şobolani ca urmare a conținutului ridicat de vitamina E şi acizi graşi nesturați omega 3 şi omega 6. ***Obiective.*** S-a urmărit experimental efectul suplimentării cu ulei din semințe de cânepă asupra balanței oxidanți/antioxidanți în sânge în efortul fizic la şobolani. ***Metode.*** Cercetările s-au efectuat pe nouă loturi (n=10 animale/lot) de şobolani masculi, adulți, rasa Wistar. Loturile I-IV au cuprins şobolani antrenați la efort cu intensitate diferită, loturile V-VIII au cuprins şobolani antrenați la efort cu intensitate diferită şi suplimentați cu ulei de cânepă iar lotul 0 a fost lot martor. La toate loturile s-a determinat balanța oxidanți/antioxidanți în sânge. Antrenamentul la efort s-a desfăşurat pe parcursul a 28 de zile. ***Rezultate.*** Valorile indicatorilor stresului oxidativ au crescut la toate loturile studiate pe seama MDA şi PC, comparativ cu lotul martor. Valorile indicatorilor apărării antioxidante au crescut pentru toți indicatorii studiați (GSH, DH, SH) la loturile cu intensitate scăzută a efortului cu şi fără suplimentare cu ulei. La loturile cu intensitate ridicată a efortului, valorile DH au scăzut iar valorile GSH au crescut, modificările fiind mai accentuate la loturile suplimentate cu ulei. ***Concluzii.*** Efortul fizic cu diferite intensități influențează nefavorabil balanța O/AO. Suplimentarea dietei cu ulei de cânepă favorizează creşterea valorilor indicatorilor SO comparativ cu lotul martor şi cu loturile fără suplimentare şi influențează favorabil apărarea AO în special pe seama creşterii valorilor GSH.

Cuvinte cheie: şobolani, ulei de cânepă, efort fizic, antioxidanți naturali nutriționali, stres oxidativ.

Background

Intense exercise is associated with increased need for ATP and increased aerobic respectively anaerobic metabolism, leading to formation of increased amounts of reactive oxygen and nitrogen species (RONS) and the appearance of oxinitrozative stress (ONS). Muscular, nervous, cardiovascular, endocrine systems have different demands during exercise, and coping strategies aim to: increase the antioxidant defense (AO), increase activity of "repair" enzymes, reduce oxidative damage and increase resistance to SON, due to changes in redox homeostasis or changing oxidant/antioxidant (A/AO) balance.

To prevent cellular damage produced by free radicals, the organism developed a defense mechanism: antioxidant system. Antioxidant is any substance present in small concentrations in relation to the concentration of substrate oxidized which significantly prevents or delays the oxidative degradation of the substrate (Halliwell B. & Gutteridge J.M., 1995).

AO are compounds that protect biological systems against the harmful effects of processes or reactions that produce excessive oxidation. AO defense is achieved through endogenous antioxidants, and if these mechanisms are overcome, through the exogenous.

Antioxidants have the role to neutralize or remove the RSO, RNS and products of organic molecules oxidation. It is important to note the existence of primary, prophylactic AO that lower the frequency of reactions leading to formation of free radicals and block the spread of those already produced. AO might have a dual action: antioxidant or prooxidant (PO); also they might be self oxidized and become PO (Tache S., 2006).

According to their presence in food, two types of AO can be distinguished: dietary and non dietary. Dietary AO are food or water constituents (Dejica D., 2001). They are found in food along with protein, lipids, and carbohydrates and are represented by: vitamin, Vitamin C, carotenoids, conjugated dienoic isomers of linoleic acid, flavonoids, peptides and amino acids, vitamin B2, vitamin H, garlic, spices. Non dietary natural AO are: ubiquinones, flavonoids, metallothioneins, superoxide dismutase (SOD), extracellular CuZnSOD, catalase, glutathione, ceruloplasmin, melatonin, estrogen, polyamines, α-lipoic acid, adenosine, nicotinamide, lactoferrin, arginine, potassium, copper (Tache S., 2006).

Hemp oil contains vitamin E and polyunsaturated fatty acids omega 3 and omega 6, especially linolenic acid and therefore is used as an important source of antioxidants (Uluata S. & Özdemir N., 2012). Proved AO action of hemp oil and the favorable effects of AO on aerobic capacity demonstrated in rats (Bulduş C. et al.,2012) have led us to study the influence of diet supplementation with hemp oil on the O/AO balance in blood.

Aims

We aimed to study the effect of dietary supplementation with hemp oil, known as a source of natural nutritional AO on the serum O/AO balance values in the blood of exercise trained rats.

Materials and methods

The study is a prospective longitudinal study of experimental type, performed on animals.

The research was conducted at the Department of Physiology and Pharmacy "Iuliu Haţieganu", Cluj-Napoca, in the Laboratory of Experimental Physiology, on nine groups (n = 10 animals / group) of adult male Wistar rats, with the average weight of 200 - 300 g, maintained under adequate vivarium conditions. The animal protection legislation was respected during the experimental researches.

a) *Groups*

Groups I to IV comprised rats trained at different effort intensities, Groups V to VIII included rats trained with different intensity of effort and supplement with hemp oil and group 0 was the control group. Intensity of exercise was modified by loading animals with different weights as follows: Group I and V by 10%, Group II and VI by 15%,

Group III and VII by 20% of body weight. Group IV and VIII were trained with progressive loading as follows: days1-7 of trainning without load then, the load was 10% during days 8-14, 15% during days 15-21 and 20% during days 21-27.

PUFA supplementation was made by oropharyngeal gavage using hemp seed oil in amounts of 0.1 ml per rat, dose calculated in relation to oil ratio recommended to human daily intake. The hemp oil product used, called Canah Hemp Oil, is manufactured by SC Canah International LLC and has the following characteristics of 14 g per serving: energy value: 126 Kcal/14g and chemical composition: 1.4 g saturated AG, PUFA 12.5 g of which 1.7 g oleic acid, linoleic acid 7.7 g, acid gamma-linolenic acid a, 5 g, α linoleic acid 2.5 g, 0.1 g stearidonic acid, vitamin E 1.35 mg (13.5% RDA).

b) *Aerobic exercise training* was made by swimming with load in thermostated water at 20-22 ˚ C, daily for 28 days. Swimming time was the elapsed time in seconds since the introduction of animals into the pool until exhausted.

c) *Oxidants/antioxidants balance*

In order to determine the indicators of O/AO balance, venous blood samples were collected from retro bulbar sinus. Biochemical determinations were performed in the Laboratory for Oxidative Stress Study in the Physiology Department of "Iuliu Haţieganu" University, Cluj-Napoca. Serum was separate from collected blood by centrifugation in order to determine the OS indicators. The analyzed moment of time was day 28.

As indicators of the O/AO balance were determined:

1. malondialdehyde (MDA) using fluorescence dosing method, after Conti (2001). Values are expressed as *nmol/ml* in serum.
2. protein carbonyls (PC) using Reznik (1994) method. The concentration values are expressed in *nmol/ml.*
3. hydrogen donor capacity (DH) using Janaszewska (2002) dosing method. Results were expressed as percentage inhibition of free radical (*i*%).
4. sulfhydryl groups (SH) using method by Hu (1994). The concentrations are expressed in μmol/ml.
5. glutathione (GSH) using fluorescence dosing (Hu, 1994). Values are expressed as nmol/ml.

d) *Statistical analysis*

Statistical calculations were performed with Microsoft Excel and SPSS 13.0 (demo versions). Statistical study was performed using Kolmogorov-Smirnov test, based on which, it was decided the application of t-test (Student), analysis of ANOVA variance, analysis post-hoc multiple comparison (Scheffe test), Kruskall-Wallis test and Mann-Whitney U test. The p value was pursued bilateral, with significance alpha level set at 0.05.

Results

1. Statistical analysis of O/AO balance indicators in studied groups is presented in Tables 1-5.

a) Malondialdehyde MDA

Serum MDA values increased significantly for groups I, II, V, VIII compared to control group. Hemp oil administration caused significant increases in MDA values in groups V, VIII, compared to groups III, IV and significant decreases in groups V and VI compared to the groups without oil supplementation I and II (Table 1).

Table 1. Comparative statistical analysis for MDA in the studied groups and statistically significant modifications

Group	Mean	Standard deviation	95% CI	Significant p-values	
0	2.609	0.531	2.229; 2.988	0-I **0.000**	II-V **0.05**
I	4.215	1.384	3.225; 5.205	0-II **0.000**	III-V **0.045**
II	4.888	0.668	4.410; 5.365	0-V **0.000**	III-VIII **0.001**
III	2.638	0.806	2.061; 3.214	0-VIII **0.000**	IV-V **0.004**
IV	2.523	0.322	2.292; 2.753	I-III **0.049**	IV-VIII **0.000**
V	3.827	0.726	3.307; 4.347	I-IV **0.024**	
VI	3.696	1.995	2.269; 5.122	II-III **0.000**	
VII	3.565	1.686	2.359; 4.77	II-IV **0.000**	
VIII	4.603	0.894	3.964; 5.242	V-VIII **0.047**	

b) Protein carbonyls PC

PC values were significantly increased in groups VI, VII, VIII relative to the control group. Hemp oil administration caused significant increases in PC values in groups VI, VII, VIII, compared to the groups without oil supplementation (Table 2).

Table 2. Comparative statistical analysis for PC in the studied groups and statistically significant modifications

Group	Mean	Standard deviation	95% CI	Significant p-values	
0	1.646	0.698	1.35; 2.379	0-VI **0.01**	IV-VII **0.001**
I	1.864	0.719	1.396; 2.830	0-VII **0.001**	IV-VIII **0.002**
II	2.113	1.003	1.372; 2.827	0-VIII **0.004**	
III	2.099	1.017	1.376; 2.141	I-VI **0.008**	
IV	1.758	0.535	1.791; 3.320	I-VII **0.003**	
V	2.555	1.069	2.449; 3.133	I-VIII **0.013**	
VI	2.791	0.478	2.279; 3.204	II-VII **0.016**	
VII	3.194	0.718	1.153; 2.138	III-VII **0.019**	
VIII	2.742	0.646	1.35; 2.379	IV-VI **0.002**	

c) Hydrogen donor capacity DH

Compared to control group, DH values increased in groups II, III, IV, V and VI and decreased in groups I, VII and VIII. The increase is significant for groups II, V and VI. DH serum values decreased significantly in groups VII, VIII, compared to groups V, VI. Hemp oil administration caused significant increases in DH values in groups V, VI, compared to group I and significant decreases in groups VII, VIII, compared to the groups without oil supplementation (Table 3).

Table 3. Comparative statistical analysis for DH in the studied groups and statistically significant modifications

Group	Mean	Standard deviation	95% CI	Significant p-values	
0	33.120	2.708	31.184;35.057	0-II **0.009**	III-VII **0.003**
I	32.41	5.205	28.686;36.134	0-V **0.045**	III-VIII **0.014**
II	40.643	7.062	35.591;45.694	0-VI **0.035**	IV-VII **0.036**
III	36.108	7.959	30.415;41.801	I-V **0.055**	V-VII **0.009**
IV	33.706	10.476	26.212;41.2	I-VI **0.05**	V-VIII **0.02**
V	46.777	20.261	32.283;61.272	I-VII **0.004**	VI-VII **0.009**
VI	47.311	20.541	32.618;62.005	I-VIII **0.055**	VI-VIII **0.02**
VII	25.716	3.718	23.056;28.375	II-VII **0.000**	
VIII	28.239	3.768	25.544;30.934	II-VIII **0.000**	

d) Sulfhydryl groups SH

Compared to control group, SH values increased significantly in groups II, V, VI, VII. Hemp oil administration caused significant increases in SH values in groups V, VI, VII, compared to groups III, IV and decreases in the levels of SH in group VIII, compared to groups without oil supplementation I, II, III and also significant decreases compared to other supplemented groups V,VI (Table 4).

Table 4. Comparative statistical analysis for SH in the studied groups and statistically significant modifications

Group	Mean	Standard deviation	95% CI	Significant p-values	
0	0.193	0.031	0.171;0.215	0-II **0.018**	IV-VI **0.002**
I	0.254	0.048	0.219;0.288	0-V **0.000**	IV-VII **0.009**
II	0.273	0.049	0.237;0.308	0-VI **0.005**	V-VIII **0.007**
III	0.232	0.051	0.195;0.268	0-VII **0.004**	VI-VIII **0.002**
IV	0.204	0.048	0.169;0.238	III-V **0.03**	VII-VIII **0.001**
V	0.333	0.124	0.244;0.422	III-VI **0.02**	
VI	0.284	0.050	0.248;0.319	IV-V **0.006**	
VII	0.286	0.0302	0.264;0.307		
VIII	0.213	0.0272	0.193;0.232		

e) Glutathione GSH

Serum levels of GSH recorded significant decreases for group I and significant increases for groups VII, VIII, compared to control group. Hemp oil administration caused significant increases in GSH values in groups VII, VIII, from all groups (Table 5).

Table 5. Comparative statistical analysis for SH in the studied groups and statistically significant modifications

Group	Mean	Standard deviation	95% CI	Significant p-values	
0	5.103	0.851	4.019; 4.83	0-I **0.045**	III-VII **0.000**
I	4.425	0.567	4.388; 5.150	0-VII **0.000**	III-VIII **0.001**
II	4.769	0.533	3.397; 6.533	0-VIII **0.001**	IV-VII **0.000**
III	4.965	2.192	3.429; 5.262	I-V **0.03**	IV-VIII **0.000**
IV	4.346	1.281	4.386; 6.505	I-VI **0.004**	V-VII **0.001**
V	5.446	1.488	4.857; 5.706	I-VII **0.000**	V-VIII **0.001**
VI	5.282	0.593	9.605; 15.287	I-VIII **0.000**	VI-VII **0.000**
VII	12.446	3.972	8.940; 14.764	II-VII **0.000**	VI-VIII **0.001**
VIII	11.852	4.071	4.019; 4.83	II-VIII **0.000**	

2. Statistical analysis of correlations between serum O/AO balance indicators in studied groups is presented in Table 6.

Table 6. Correlations between indicators of O/AO balance in the studied groups and significance

Indicator		Group								
		0	I	II	III	IV	V	VI	VII	VIII
MDA-PC	r	0.358	0.590	0.626	-0.685	0.264	-0.111	**-0.988*****	-0.596	-0.449
	p	0.309	0.295	0.259	0.202	0.668	0.859	**0.002**	0.289	0.448
MDA-SH	r	-0.165	**0.856*****	**-0.948*****	-0.035	0.250	-0.365	-0.410	0.364	-0.723
	p	0.648	**0.04**	**0.014**	0.952	0.684	0.546	0.493	0.547	0.167
MDA-DH	r	0.382	-0.128	**-0.858*****	-0.027	0.314	0.379	0.460	0.532	-0.057
	p	0.276	0.838	**0.040**	0.966	0.607	0.530	0.435	0.365	0.928
MDA-GSH	r	0.079	-0.122	0.261	-0.160	-0.315	-0.101	0.360	-0.229	0.527
	p	0.828	0.846	0.671	0.797	0.607	0.872	0.552	0.711	0.362
PC-SH	r	-0.173	-0.137	-0.365	0.307	-0.654	-0.775	0.530	-0.126	0.226
	p	0.632	0.826	0.546	0.615	0.231	0.124	0.358	0.841	0.714
PC-DH	r	0.053	**-0.853*****	-0.519	-0.085	-0.214	0.225	-0.323	-0.021	-0.561
	p	0.884	**0.04**	0.371	0.892	0.730	0.716	0.595	0.973	0.325
PC-GSH	r	-0.596	-0.511	-0.421	0.166	0.668	0.709	-0.215	0.590	-0.227
	p	0.069	0.379	0.480	0.789	0.218	0.108	0.729	0.295	0.714
SH-DH	r	0.445	0.295	**0.880*****	-0.815	-0.242	-0.251	0.463	-0.803	-0.185
	p	0,198	0.630	**0.049**	0.093	0.695	0.684	0.433	0.102	0.766
SH-GSH	r	0.077	-0.179	0.246	**0.852*****	-0.528	0.701	0.548	-0.518	-0.172
	p	0.832	0.774	0.690	**0.049**	0.361	0.187	0.339	0.371	0.782
DH-GSH	r	-0.035	0.361	0.554	**-0.972*****	-0.487	-0.451	**0.974*****	-0.678	-0.019
	p	0.923	0.550	0.332	**0.006**	0.406	0.445	**0.005**	0.208	0.976

Statistical study shows that among the indicators studied, after Colton's classification, correlations are acceptable, good or very good, both direct and inverse.

Discussions

Physical training induces an adaptive biochemical response, which may require an increase intake and/or absorption of micronutrients. How acute or chronic exercise modifies antioxidant requirements is still unclear. ONS can not be avoided but the imbalance between oxidants and antioxidants may be attenuated by nutritional AO administration to reduce oxidative damage and ONS consequences.

There is growing evidence that AO itself can not prevent the production of SO. As direct adverse effects of AO supplements are synergistic adverse effects. Adverse effects are assumed to limit the effect of endogenous adaptive effects of chronic exercise. High doses of antioxidant supplements can minimize the positive effects induced by ROS or generate prooxidant effects. Only when nutritional status is poor, the administration of nutritional supplements in athletes is needed. Risk/benefit analysis shows evidence of an unknown risk of AO administration in supra nutritional doses, a decline in adaptive effects and a still unknown long-term risk (Margaritis I. &Rousseau A.S., 2008). Potential adverse effects of dietary AO supplementation during exercise training were also highlighted by Peternelj T.T. and Coombes J.S. (2011).

ONS occurs when exercise intensity is high and cause oxidation of GSH, releases enzymes from cytosol and signs other cellular damage (Liu J et al. 2000).

A study by Bachur et al. (2007) shows increased MDA values and decreased GSH values after exercise with loading. In a recent study Filaire et al. (2011) show that dietary supplementation with omega-3 PUFA resulted in increased oxidative stress indicators at rest and did not reduce exercise-induced OS.

Our previous research (Bulduş C. et al., 2012) showed the favorable effect of hemp oil supplementation on aerobic capacity in rats as follows: maximum increase of aerobic capacity is when the load of 10% and oil supplementation, compared to load of 15% and 20% with or without oil supplementation.

Another of our previous studies (Bulduş C.ş.c.2012) shows that hemp oil supplementation and progressive loading (in three steps) causes a significant increase in aerobic exercise capacity in 27 days training, compared to groups without oil supplementation. Fluctuations of exercise capacity values, caused by progressive loading, are reduced in groups with oil supplementation.

Our study shows that the values of MDA, PC and SH increased in all groups. DH values were recorded both increases and decreases, decreases were predominating in groups trained at high-intensity exercise and progressive load respectively and supplemented with oil. GSH values decreased in groups without oil supplementation but significantly increased in groups supplemented with hemp oil.

Hemp oil supplementation favorably influenced the AO defense and also increased the values for SO indicators. Thus, appears the question of the addition between the benefits of hemp oil antioxidants and antioxidant effect of exercise. Antioxidant role of exercise has been shown by several authors (Radak ş.c. 2008, Gomez-Cabrera ş.c. 2008, Tache S. and M. Staicu L 2010).

Conclusions

Exercise with different intensities unfavorably affects the O/AO balance. OS increase on account of the rise in serum MDA and PC. Changes are lower in groups with low intensity exercise and are significant in groups with high intensity effort.

Exercise unfavorably influence AO defense due to the decrease GSH in groups without oil supplementation.

Hemp oil dietary supplementation induces elevated OS indicators compared with control and groups without oil supplementation.

Administration of hemp oil favorably influence AO defense uniformly in groups trained with low-intensity exercise and fluctuating in groups trained with high-intensity exercise.

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THE EFFECT OF CHRONIC HYPOBARIC HYPOXIA AND THE INTAKE OF ZINC ON EFFORT CAPACITY IN NORMOBARIC NORMOXIA CONDITIONS

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ABSTRACT. ***Background.*** The intake of zinc has shown great improvements on aerobe effort capacity and oxidants/antioxidants balance (O/AO). ***Aims.*** Trained animals was monitored experimentally under conditions of normobaric normoxia (NNB), the immediate effect of zinc supplementation on aerobic capacity, and the immediate effect of zinc supplementation, exposure to chronic hypobaric hypoxia (HHC), 1500, 2500, on the aerobic exercise. ***Methods.*** The research was conducted on six lots of animals (n=10/lot), Wistar rats, exposed to HHC, in 1500m, 2500m, simulated altitude. The lots were exposed to training (running) with or without intake of Zn. ***Results.*** Our research results suggest that zinc supplementation, training and exposure to hypobaric hypoxia increases aerobic capacity. ***Conclusions.*** Zn supplementation, training and exposure to hypobaric hypoxia cause a significant increase in aerobic exercise capacity under conditions of normobaric normoxia baseline.

Key words: zinc, aerobe exercise capacity, physical effort, oxidants, antioxidants, hypobaric hypoxia.

REZUMAT. Efectul hipoxiei hipobare cronice şi administrării de zinc asupra capacităţii de efort în condiţii de normoxie normobară. ***Premize.*** În vederea îmbunătăţirii performanţelor fizice, suplimentarea de zinc (Zn), a arătat efecte benefice asupra capacităţii aerobe de efort şi balanţei oxidaţi/antioxidanţi (O/AO). ***Obiective.*** S-a urmărit experimental la animale antrenate, în condiţii de normoxie normobară (NNB) efectul imediat al suplimentării de Zn asupra capacităţii aerobe de efort; şi efectul imediat al suplimentării de Zn, preexpunerea la hipoxie hipobară cronică (HHC), 1500, 2500m, asupra capacităţii aerobe de efort. ***Metode.*** Cercetările au fost efectuate pe 6 loturi de animale (n=10 animale), rasa Wistar, expuse la HHC, corespunzătoare altitudinii simulate de 1500m, 2500m. Loturile au fost supuse la efortul de alergare, pe banda de fugă, cu şi fără suplimentare de Zn. ***Rezultate.*** Rezultatele cercetărilor noastre sugerează că suplimentarea de Zn, antrenamentul şi expunerea la hipoxie hipobară determină creşterea capacităţii aerobe de efort. ***Concluzii.*** Suplimentarea de Zn, antrenamentul şi expunerea la hipoxie hipobară determină creşteri semnificative ale capacităţii aerobe de efort, în condiţii de normoxie normobară faţă de valorile iniţiale.

Cuvinte cheie: zinc, capacitate aerobă de efort, efort fizic, oxidanţi, antioxidanţi, hipoxie hipobară.

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Introduction

Zinc is involved in over 300 enzymes, covering all six classes of their work. (Frassinetti, et.al, 2006, Micheletti, et.al 2001). Zinc is a cofactor in the structure of enzymes involved in oxidative processes: family carbonic anhydrase, alkaline phosphatase, α-monooxidaza, aminopeptidaza, tryptophan desmolaza, leukocyte protease Zn, carboxipeptidazele A and B, some deshidrogenaze, neutral endopeptidase.

Zinc is involved in neuronal protection using zinc as a neuromodulator protorfirinei affecting carriers of neuromediators, (Nørgaard, et.al, 2006).

More recent data show that zinc can act on thyroid function, influencing the thyroid hormone metabolism. Kilic's research shows that zinc prevents inhibition of thyroid hormone (T3 and T4), TSH and testosterone after exhausting effort. (Kilic, et.al, 2006).

Zinc promotes normal absorption and action of B complex vitamins and vitamin A. The synergistic action of vitamin B1 that. Zinc is involved in the metabolism and transport of vitamin A, having a role in maintaining normal vitamin A concentrations in plasma, it is essential for normal mobilization of liver vitamin. This explains in part why some cases of hypovitaminosis A not respond to vitamin-A therapy, but after an additional positive influence on zinc, it appears that zinc is essential to form retinol-binding-proteins. (Kanazawa, et.al, 2002)

Objectives

We pursued experimentally in trained animals under normobaric normoxia conditions (NNB):

- the immediate effect of zinc supplementation on aerobic capacity;
- the immediate effect of zinc supplementation, pre exposure to chronic hypobaric hypoxia (HHC), at 1500, 2500m altitude, on aerobic exercise capacity.

Material and methods

Research has been conducted on white rats, Wistar, male, weighing 160-180 g, from the "Iulius Haţieganu" University of Medicine from Cluj-Napoca. The animals were maintained in appropriate conditions in the Department of Physiology - "Iuliu Haţieganu".

Exposure to hypoxia was performed in a hypobaric chamber fitted in the experimental laboratory of the Department, for 28 days - chronic exposure. The rats were given Zn, product Walmark by oral gavages, daily intake of 0.01mg/100g/animal. Doses were calculated according to the therapeutic administration in humans /24 hours.

a) Experimental groups

6 groups of rats, Wistar, white, weighing 160-180 g, trained for 28 days under normobaric normoxia.

- Group I -witness under normobaric normoxia;
- Group II - normobaric normoxia and intake of Zn;
- Group III - exposed to chronic hypobaric hypoxia at 1500 m;
- Group IV - Zn intake and exposure to chronic hypobaric hypoxia at 1500 m;
- Group V-exposed to chronic hypobaric hypoxia 2500 m;
- Group VI - Zn intake and exposure to chronic hypobaric hypoxia and 2500 m.

b) Training program

Exploring aerobic exercise capacity was based on the treadmill test. Were studied the moments: T0 (day 0), T1 (day 7), T2 (day 14), T3 (day 21), T4 (day 28).

c) Statistical analysis was performed using SPSS 13, Statistics 7.0 and Microsoft Excel. Materiality for the tests used was taken $\alpha = 0.05$.

Results

- In all groups the exercise capacity increased significantly during the 28 days (Table 1.)
- Zn supplementation under normobaric normoxia at 363 m (group II) leads to a less pronounced increase in the exercise capacity than animals without zinc (Group I) (Table 2.)
- Zn supplementation and hypobaric hypoxia at 1500 m or 2500 m (group IV and VI) does not determine any change in exercise capacity compared to animals without Zn, but exposed to the same altitude (Group III and V) (Table 2.).
- Exposure to altitude of 1500 m and 2500 m (Lots III and V) results in an increase in exercise capacity, less pronounced than in unexposed animals at an altitude of 1500 m and 2500 m (group I) (Table 3.).

Exercise capacity was compared between moments T0, T1, T2, T3, T4, at each of the lots. Exercise capacity (in sec) differs significantly between times in which it was measured. (Table 1.).

Table 1. Comparing the exercise capacity, T0 – T4 moments, in I - VI groups, untrained animals

Arithmetic Average	T0	T1	T2	T3	T4	p
Group I	157,40	318,90	503,00	570,10	689,40	<0,0001
Group II	198,96	244,36	510,00	552,90	548,60	<0,0001
Group III	272,40	290,80	306,60	321,10	338,10	<0,0001
Group IV	275,10	286,70	302,20	321,70	348,30	<0,0001
Group V	154,10	164,00	193,90	214,20	236,70	<0,0001
Group VI	135,80	161,40	181,00	213,00	240,70	<0,0001

The exercise capacity was compared between trained animals groups with and without Zn (Table 2.). Most comparisons were not significant, no significant differences were found between groups.

Table 2. Comparing the exercise capacity in trained animals, exposed to same altitude, with and without intake of Zn

		T0	**T1**	**T2**	**T3**	**T4**
Group I	Group II	**<0,0001**	**<0,0001**	1,00	1,00	**<0,0001**
Group III	Group IV	1,00	1,00	1,00	1,00	1,00
Group V	Group VI	1,00	1,00	1,00	1,00	1,00

The exercise capacity was compared in trained animals without Zn, exposed to different altitudes (Table 3). Most comparisons were significant, with significant differences between groups.

Table 3. Comparing the exercise capacity in trained animals, exposed to different altitudes without Zn intake

		T0	**T1**	**T2**	**T3**	**T4**
Group I	Group III	**0,0002**	1,00	**<0,0001**	**<0,0001**	**<0,0001**
Group I	Group V	1,00	**<0,0001**	**<0,0001**	**<0,0001**	**<0,0001**
Group III	Group V	**0,0001**	**0,0004**	**0,0003**	**0,008**	**0,003**

The exercise capacity was compared in trained animals with Zn intake, exposed to different altitudes (Table 4.). All comparisons were significant, with significant differences between groups.

Table 4. Comparing the exercise capacity in trained animals, exposed to different altitudes with Zn intake

		T0	**T1**	**T2**	**T3**	**T4**
Group II	Group IV	**<0,0001**	**<0,0001**	**<0,0001**	**<0,0001**	**<0,0001**
Group II	Group VI	**<0,0001**	**<0,0001**	**<0,0001**	**<0,0001**	**<0,0001**
Group IV	Group VI	**<0,0001**	**0,0004**	**<0,0001**	**0,007**	**0,001**

Within the study we have found in generally a very good correlation between exercise capacity: moments T0 and T4. (Table 5.). Table 5 presents the Pearson's correlation coefficient r between exercise capacity, initial and final moment which was measured on groups I - VI.

Table 5. The correlation between the indicators of the exercise capacity in I-VI groups

	Group I	**Group II**	**Group III**	**Group IV**	**Group V**	**Group VI**
T0 and T4	-0,31**	0,87****	0,91****	0,95****	0,89****	0,97****
*** weak correlation or no existed ** acceptable correlation *** good correlation **** very good correlation (classification for Colton)**						

Discussion

The melatonin supplementation in Spraque-Dawley rats, exposed to acute exercise conducted by swimming leads to a reduced lactate level, thus delaying fatigue. High levels of zinc can mediate the effect of melatonin. (Kaya, et.al, 2006)

There are few data regarding the effect of zinc, an essential element on performance. Studies conducted on the relationship between zinc and performances are focused mainly on the distribution of this element in the body, in relation to physical effort. Additional studies in rats with zinc intake led to a significant increase in testosterone levels and a significant decrease in lactate levels, therefore zinc supplementation may be useful in achieving performance. (Kaya, et.al, 2006)

Exhausting exercise determines significant decreases in serum levels of leptin in rats with zinc deficiency, followed later by lower leptin levels in rats with a zinc deficient diet and exercise performed. (Gokbel, et.al, 2005)

Zinc deficiency negatively affects copper, iron, calcium, phosphorus and that these effects were more marked after effort. (Baltaci, et.al, 2010)

Conclusions

Training increases aerobic capacity.

Zn supplementation under NNB leads to an increased exercise capacity compared to initial values.

Zn supplementation, pre exposure to HHC and training favors aerobic exercise capacity under NNB conditions compared to initial values.

The increase in aerobic capacity, after exposure to HHC in groups with and without Zn is moderately and significantly lower than unexposed groups in HHC.

The increase in aerobic capacity in terms of NNB, after exposure to HHC, in groups with Zn intake is significantly reduced after exposure to 2500 m, compared to those exposed to 1500 m.

Zn supplementation and exposure to HHC does not favor immediate performance improvement in terms of NNB.

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