



STUDIA UNIVERSITATIS  
BABEŞ-BOLYAI



# EDUCATIO ARTIS GYMNASTICAE

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**UNIVERSITATIS BABEŞ – BOLYAI**  
**EDUCATIO ARTIS GYMNASTICAE**

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Desktop Editing Office: 51<sup>ST</sup> B.P. Haşdeu, Cluj-Napoca, Romania, phone + 40 264-40.53.52

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## WHAT IS THE ATTITUDE OF ROMANIAN TEENAGERS TOWARDS SPORT?

BACIU ALIN<sup>1</sup>, RUSU FLAVIA-ILEANA<sup>1</sup>, ȘANTA CRISTIAN<sup>1</sup>

**ABSTRACT.** The sport can be a powerful factor of social integration for the youth. The responsibility of using such a factor belongs to those who are actively involved in the process of education. That's why they must know what are the attitudes and the opinions of youngsters about sport. In order to find that out, standardized questionnaires were used. The results obtained suggest the presence of an attitude of awareness towards the importance of physical activity and sport in adolescents' every day life.

**KEYWORDS:** sport, teenagers, attitudes, social integration, lifestyle

**REZUMAT.** Care este atitudinea adolescenților români față de sport? Sportul poate fi un factor important în integrarea socială a tineretului. Responsabilitatea utilizării acestui factor aparține acelor care sunt implicați activ în procesul de învățământ. De aceea, aceștia din urmă trebuie să cunoască opiniile și atitudinile tinerilor față de sport. Pentru a afla care sunt acestea s-au folosit chestionare standardizate. Rezultatele obținute sugerează prezența unei atitudini conștiente față de importanța activității fizice și sportului în viața de zi cu zi a adolescenților.

**CUVINTE CHEIE:** sport, adolescenți, atitudini, integrare socială, stil de viață.

### BACKGROUND

Socialization in and through sport is the main responsible factor for the place occupied by sport in a society. A high standard of living and a regular practice of sport at all age categories is an indicator of the quality of life.

The future of a country is determined by his future adults. It is therefore important for the society to invest in children, both institutional-formal, and values induced by the family, school, etc. Among the most "healthy" values are included those which sport brings with itself, directly and indirectly: team spirit, fair-play is, the ability of organization and coordination of activities, and knowledge of the rules.

In our opinion that sports to become really a powerful factor of social integration, it is necessary for those who are involved in the process of education and training of the young generation to know the attitudes and opinions of youth about sport.

We also tried to find out if there is a significant relationship between the profession of the teenager's parents and the teenagers' attitude towards sport.

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<sup>1</sup> Babes-Bolyai University of Cluj-Napoca; Faculty of Physical Education and Sport; e-mail: alinbaciunarius@yahoo.com

## METHOD

To find out which are the opinions, attitudes and behaviors of adolescents regarding sport, we used the technique of standardized questionnaire. This method has inherent disadvantages, like any survey: the possibility of answers inconsistent with reality, tend to go over the top, social desirability, etc. We tried to reduce these shortcomings through some control questions.

The questionnaire consists of 28 items and it has been applied to a number of 181 adolescents (106 girls and 68 boys), students in Cluj-Napoca.

The selection of subjects in the young population in respect of contrasting samples principle for two aspects: types of schools and age (15-16 years, 18-19 years).

## RESULTS

Selecting some of the results from the first question of opinion, we present below those relevant.

**Table 1.**  
**Which of the following sports are most valued?**

No.	Sports appreciated (in order of frequency)	Options (%)
1	Volleyball	37,6
2	Football	34,8
3	Handball	28,7
4	Gymnastics	27,1
5	Field Tennis	24,9
6	Basketball	23,8
7-13	Martial arts,... rugby	19,9 - 7,2
14	Swimming*	5,0
15	Track and field*	2,8
16	Motor race *	2,8
17	Snooker*	2,2
18	Skating *	1,7
19	Others **	5,5

\* Sports not mentioned in questionnaire

\*\* Others sports mentioned: country cross, roller,chees, horse race, fitness, ski, extreme sports, dance, judo

It can be seen that were mentioned on the first places sports practiced traditionally in Romania (volleyball, soccer, gymnastics). The sports which have begun to be known in recent decades (martial arts, kick box, and motocross) occupied the 7-13<sup>th</sup> places. The results show a certain specific national in teenager's preferences.

The results obtained traditionally by one of the nation at a particular sport and the practice with priority in schools of some sports in schools or sports clubs (more football, volleyball, handball) provides a specific profile of such ranking.

#### WHAT IS THE ATTITUDE OF ROMANIAN TEENAGERS TOWARDS SPORT?

The specific of age is evident in free options (unmentioned in the questionnaire) for sports with smaller scale in the Olympic movement, but attractive and fun: kick box, motocross, roller, extreme sports).

The question about the sport practice by teenagers now we have obtained the following frequencies, in descending order.

**Table 2.**  
**What sport do you practice now (a single preference)?**

No.	Sport	Preferences(%)
1	Basketball	19,3
2	Football	11,0
3	Volleyball	8,8
4	Handball	7,7
5	Cycling	3,9
6	Swiming*	3,9
7	Gymnastics	3,3
8	Field Tennis	3,3
9	Table Tennis	3,3

The last options are for the martial arts (2.2%), dance sport and athletics and dance (2,2 % and 1,7 %), kikbox, box and rugby (1,1 %, 0,6%). For "other sport" with 4,4 % it was mentioned: snooker, cross country, chess, fitness, extreme sports, wrestling, judo, water polo.

While are diverse, the latter is not a significant movement or fashionable sports for the young adolescents of our country.

The fact that on the first places are sports like basketball, football, handball and volleyball, highlight a specific reality: these sports are not very expensive at this level. On the other hand they are team sports, where both young people can be part in a competitive environment.

In these sports the trainers may exercise their profession with a greater number of players in the same period of time, and employing institutions save money and time. It is an explanation for the occupied by tennis field (instead of 7, along with gymnastics and table tennis) or dance sports. These are sports that need quite high costs, even at beginners (equipment and travel to competitions or shows, pay teachers, etc.).

May watched sports on TV than they are - as expected - ranked according to national popularity: football (43.1%), gymnastics (17.1%), handball (11.6%), tennis field (9, 4%), basketball (8.8%), and box (7.2%). It is interesting that motor race or track and field obtained a percent quite small, although they are quite media on TV (3.9% and 2.2%). It is clear that the emergence of great sportsman can lead to a revitalization of youth sports in the options. The fact that the tennis players Ilie Năstase, Ion Țiriac, the football players Gheorghe Hagi, Cristian Chivu, the gymnasts Nadia Comăneci, Andrea Răducanu (to mentioned only some name) have become true symbols of national generates a current strength of young people in such sports.

Opinion about "the practice of sport by young people in Romania compared with those from other countries" is mainly directed towards variant "the same extent" (48.9%). The variant "less" was chosen by 26.7%, and 24.4% have the opinion that the Romanian youth practice sport more than others. In the same order theme, the young respondents considered in proportion of 71% the teenagers practice not enough sports. Only 29% stating that the practice of sport is quite adequate.

At physical education classes the sport most practiced is basketball. The next sports practices in schools are also team sports, in fact, most of them popular among high school: volleyball, soccer, table tennis, and handball. The opinion about what sports would they to practice has broadly the same hierarchy.

We tried to establish a relationship between leisure time (hobby s) and place it occupies in this sport category. We found that 61.1% put on first place the music, the dance 60%, only 14.9% the trips, 13.1% Internet / computer, 10.3% activities with friends, watching TV 6.3% / movies, sleep 2.9%, 2.3% fishing, 1.1% photography, 36 % other activities not mentioned in questionnaire.

It is noted that, at least as declare the practice of sport occupies the place 2, which gives account of the important position that it occupies an extra activities in the high school. It is possible that the profile of the sport focused on the questionnaire to provide more statements in favor of practicing sport than it is in reality. Even with a great potential of distortion, this fact cannot significantly change the orientation of pro-youth sports, from an obvious reason: the practice at least the hours of physical education, sports is obviously an occasion of joy for students. This aspect emerged from the comparative analysis for several sets of questions of those questioned. We consider interesting to watch how the polarizing is subsequent to more coordinates. In the below table are presented some of these aspects:

Table 3.

## What are yours hobbies ?

<i>Category</i>	<i>Music, dance %</i>	<i>Sport%</i>	<i>Trips %</i>
Girl	<b>75,0</b>	<b>52,9</b>	<b>20,2</b>
Boy	<b>36,4</b>	<b>72,7</b>	<b>7,6</b>
High School	<b>51,3</b>	60,0	<b>22,5</b>
Professional school	<b>69,5</b>	60,0	<b>8,4</b>
Parents intellectuals	<b>45,7</b>	67,4	21,7
Parents with a special profession	<b>70,8</b>	64,6	18,8
Parents qualified worker	<b>57,6</b>	48,5	12,1
Parents inqualified worker	<b>66,7</b>	55,6	11,1
Parents dead or not active social	<b>93,3</b>	60,0	-

## WHAT IS THE ATTITUDE OF ROMANIAN TEENAGERS TOWARDS SPORT?

The fact mentioned in most statistics and worldwide surveys, that the quality of life and the practice of large-scale sports there is a close correlation, is demonstrated in our research also. It notes that significant differences are recorded in the practice of sport by teenagers coming from families of intellectuals, much more than by those who come from families of workers. A standard of living higher induce, is quite clearly, an attitude of awareness of the importance of physical activity and the ranking of priorities regarding the practice of sport in the free time.

## CONCLUSION

Knowledge and application of the principle of "mens sana in corpore sano" is not a simple good idea, but one which can verify the attitudes and behaviors of teenagers. Practice of sport needs years of hard work, capacity of concentration and responsibility. These qualities once formed contribute to the formation of strong and balanced personality to young people who practice it. Whatever sport these teenagers' practice, it is clear that without it, they would have lost a lot in physical training, psycho-emotional and ability to adapt to others, to society.

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## FATIGUE, RECOVERY AND NUTRITION OF TABLE TENNIS PLAYERS

DOBOȘI ȘERBAN<sup>1</sup>, APOSTU PAULA<sup>2</sup>, ȘANTA CRISTIAN<sup>1</sup>

**ABSTRACT.** Progress in modern sport is often a direct reflection of the quantity of work (extent and intensity) during the training. For these reasons, sportsman's organism is often brought to the threshold of biological durability and an efficient recovery becomes a primary circumstance to enable a continuing training process. By doing that, an improvement has been made in learning the methods of prevention and removing the consequences of fatigue.

**Keywords:** recovery, fatigue, rehydration, table tennis

**REZUMAT.** Oboseala, recuperarea și nutriția jucătorilor de tenis de masă. Progresul în sportul modern este o reflecție directă a cantității de muncă (gradul și intensitatea) în timpul formării. Pentru aceste motive, organismul sportivului este deseori adus în pragul biologic de o rezistență sporită și o recuperare eficientă, pentru a permite un proces de formare continuă. Îmbunătățirea este făcută prin învățarea metodelor de prevenire și înlăturarea consecințelor oboseală.

**Cuvinte cheie:** recuperare, oboseala, nutriție, hidratare

Progress in modern sport is often a direct reflection of the quantity of work (extent and intensity) during the training. For these reasons, sportsman's organism is often brought to the threshold of biological durability and an efficient recovery becomes a primary circumstance to enable a continuing training process. During past two decades there has been an enormous improvement in detecting the factors which cause fatigue. By doing that, an improvement has been made in learning the methods of prevention and removing the consequences of fatigue.

The following factors causing fatigue are known:

1. hyperthermia;
2. dehydration;
3. demineralization;
4. depletion of energy depots:
  - a) ATP of muscles
  - b) CP of muscles
  - c) Glycogen of muscles
  - d) Glycogen of liver

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<sup>1</sup> Physical Education and Sport Faculty of Cluj-Napoca, **mail: serban\_dobosi@yahoo.com**

<sup>2</sup> Physical Education and Sport Faculty Extension of Bistrița

5. transmembrane dislocation of K;
6. intracellular dislocation of Ca;
7. changes of electrochemical reaction;
8. effect of free radicals;
9. depletion of neurotransmitter depots;
10. psychological factors.

Eight out of these 10 factors are directly bonded with nutrition, which makes nutrition one of the primary factors in the fight against fatigue. In this report, the most important fatigue and nutritional factors for table tennis players will be covered.

### **WATER AND MINERLAS**

Muscle work produces large quantities of heat energy (about 75% of energy being freed by muscle contraction is heat energy, whereas only 25% converts into mechanical work) which charges severely the thermoregulatory mechanisms in sportsmen organisms. Of four mechanisms which can regulate temperature during the intensified heat production (irradiation, conduction, convection and evaporation) by far the most important mechanism is sweat evaporation from skin surface.

This way, up to 70% of heat surplus can be canceled. With one L of sweat, under ideal circumstances, however, 2-3 Ls of sweat are necessary to cancel 580 cal. Regulatory mechanisms for sweat secretion function in a way that sweating begins practically simultaneously with physical work. It is plenty as energy production increases during work, and if the evaporation circumstances are bad (high humidity of surrounding air, lack of streaming, protective clothing preventing sweat evaporation, etc). No matter how plenty, sweat is an integral part of every muscle work. Sweating cancels large quantities of water and minerals from sportsmens organisms.

Lacking of water in an organism, dehydration, negatively influences the physical working capability for several reasons:

1. renders difficult thermoregulation;
2. reduces peak heart volume and functional capacity of cardiovascular apparatus;
- 3.

Hydration state is not only important for physical working capability, but also for the degree by which effects his organism. Every dehydration which is more than 2-3% of body mass becomes a pathological dehydration. Pathological dehydration occurs easier if sportsman has been dehydrated before performance, and it often leaves permanent consequences.

In according to importance of the mechanisms above, the primary task in recovery after performance is rehydration – recovery of cost water.

## **CONTROLL OF DEHYDRATION GRADE**

Objective control of dehydration grade during every training should be a practice of every sportsman . 85-90% of body mass lost during training is loss of water by sweating. By weighing sportsman before and after training an objective dehydratant rate can be established, as well as the liquid quantity which should be consumed in order rehydration. About 80% of lost body mass should be made up by liquids as soon as possible, within first 2 hours after training/competition. Before the rehydration is completed, sportsman should not begin with his meal. Sportsman should be kept under control until they are rehydrated.

## **REHYDRATION**

Rehydration is fasted and most efficiently completed with pure water. Presence of any minerals (salts, electrolithes) or any organic materials in water (sugar...) in concentration over 0.2% (salts) or 2% (sugars) slow down the resorption of water from digestive tract and decreases efficiency and speed of rehydration. Liquids containing more then 1% of salt – 5% of sugar can even temporarily increase the level of dehydration of vascular compartment of body – they can decrease the volume of circulating plasma because of the shifting of water from blood vessels to digestive tract. For rehydration most adequate is cold mater (4-12° C) because it reabsorbed fastest, but more important is how much and how soon it is intake. In general, sportsman should drink water of temperatures they are used to. For rehydration natural trait juices can be diluted with water in 1:5 ratio (most juices contain about 10% of sugar, which brings sugar concentration down to acceptable level by diluting them 5 times) or soft drinks like coke, diluted in the same ratio.

In sportsman who have not been fully rehydrated the following should be expected:

1. decreases of working capability;
2. chronicle fatigue

## **DEMINERALISATION**

A large quantity of minerals is lost with water during sweating, most of all: sodium, potassium, calcium, magnesium. Although quantitative smaller then losses of sodium, losses of other minerals are larger for two reasons: during physical work and even during rest in well trained sportsman a mechanism which decreases Na losses through kidneys is active and even for losses of Na through sweating. For these reasons, sportsman should not pay special attention to Na losses.

By adequate nutrition an usual salting of the food Na quantities are recovered. Unlike sodium, potassium losses are very important. Magnesium and calcium losses also. Many sportsman, because of large losses of these minerals and inadequate remineralization have decreased concentrations of these minerals. The symptoms of demineralization can easily detected. Most common are cramp in as well

as abdominal cramps (stomach pains) which are typical signs of hypotassinemia (decrease of the potassium concentrations). Demineralization is a state connected with the decrease of physical working capability.

### CONCLUSION

The process of recovery from exercise involves restoration of the muscle and the rest of the body to their pre-exercise condition. During recovery from exercise, oxygen consumption remains elevated above the resting level for varying lengths of the time. The additional oxygen consumed above rest is termed the recovery oxygen.

Oxygen is stored in skeletal muscle in chemical combination with myoglobin. Although the stores are small, they are of importance during intermittent exercise because they are used during the work periods and are restored during recovery is rapid, requiring only a few seconds, and depends on the availability of oxygen. The oxygen is part of the fast component of recovery.

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## THE EFFECTS OF ACTIVE - ALERT HYPNOSIS ON MOOD CHANGES IN ELITE ATHLETES

CRĂCIUN MARIUS<sup>1</sup>, SZATMÁRI CSILLA

**ABSTRACT.** *The Effects of Active-Alert Hypnosis on Mood Changes in Elite Athletes.* The purpose of this study was to evaluate the effects of active-alert hypnosis (Banyai et. al., 1976) on mood state changes of elite athletes, using the Profile of Mood States (POMS – McNair et al, 1992). The POMS was administered before and after active-alert hypnotic session to 12 Romanian elite athletes (Olympic Judo Team–women). All subjects showed the iceberg profile after the active-alert hypnosis session. Conclusions: Active-alert hypnosis may be integrated as an adjuvant to other methods used in sport psychology, due to its effects on mood changes, which leads to the successful athletes' mood states profile.

**KEYWORDS:** active–alert hypnosis, induction techniques, mood states, iceberg profile, self–hypnotic technique.

**REZUMAT.** *Efectele hipnozei activ-alerte asupra dispozițiilor afective la sportivii de elită.* Studiul își propune să evalueze efectele hipnozei activ-alerte (Banyai et. al., 1976) asupra dispozițiilor afective la sportivii de elită, utilizând testul POMS (Profile of Mood States, McNair et. al., 1992). Testul POMS a fost aplicat înainte și după o sesiune de hipnoză activ-alertă la 12 sportivi de elită (Lotul Olimpic de judo, feminin). La toți subiecții am constatat prezența profilului iceberg, după ședința de hipnoză activ-alertă. Concluzii: Hipnoza activ-alertă poate fi integrată ca un adjuvant, împreună cu alte strategii de intervenție, pentru a crea un profil ideal al dispozițiilor afective necesar performanțelor de succes.

**CUVINTE CHEIE:** hipnoză activ-alertă, tehnici de inducție, dispoziții afective, profil iceberg, tehnică de auto-hipnoză.

### INTRODUCTION

Perhaps, because it is poorly understood, hypnosis is not widely utilized intervention strategy in sport. Nideffer (1992) is one of the few sport psychologists who advocate its use on a broad scale.

Psychologist can agree that hypnosis is closely linked with the notion of being responsive to suggestion. If an athlete is already responsive to suggestions, then other forms of intervention such as relaxation, meditation, and imagery may be just as effective as hypnotism.

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<sup>1</sup>“Babeș-Bolyai” University of Cluj Napoca; Faculty of Psychology and Educational Sciences;  
e-mail: marius\_craciun48@yahoo.com

Hypnosis is a cognitive – behavioral process that has both a cognitive function and a motivational function. In a cognitive sense, hypnosis is used to restructure the way athletes think about themselves and about the way they perform and learn new sport skills. In a motivational sense, hypnosis is used to modify emotions, reduce anxiety, increase or decrease arousal, and increase effort (Cox, 2002). Five phases are associated with inducing the hypnotic trance in a subject: preparation of the subject, the induction process, the hypnotic phase, waking up, and the posthypnotic phase. Hypnotic suggestion and posthypnotic suggestions are given during the hypnotic phase.

While there may be some potential risks associated with the indiscriminate use of hypnosis by an untrained therapist, most concerns about hypnosis are unfounded. Hypnosis is more clouded by myths and misconceptions than any other form of psychological intervention.

### **Hypnosis and athletic performance**

We can summarize a list of basic principles on this topic, based on a review of published article:

1. The more open and susceptible an athlete is to suggestions, the more likely it is that he will benefit from suggestions given to him under hypnosis.
2. Once an individual is hypnotized, the deeper the trance is that she is able to achieve, the more likely it is that suggestions given under hypnosis will be effective.
3. Positive suggestions are effective in facilitating performance, regardless of whether or not the athlete is hypnotized. If an athlete will accept positive suggestions uncritically, it makes little difference whether she is hypnotized at the time or not.
4. General arousal techniques are more useful than hypnotic suggestions in enhancing muscular strength and endurance, because hypnosis tends to relax an athlete.
5. Negative suggestions almost always cause a decrement in performance. Negative suggestions given to an athlete under suggestion are very powerful and counterproductive.
6. Hypnosis may be able to help a successful athlete; but cannot make a good performer out of a poor one.

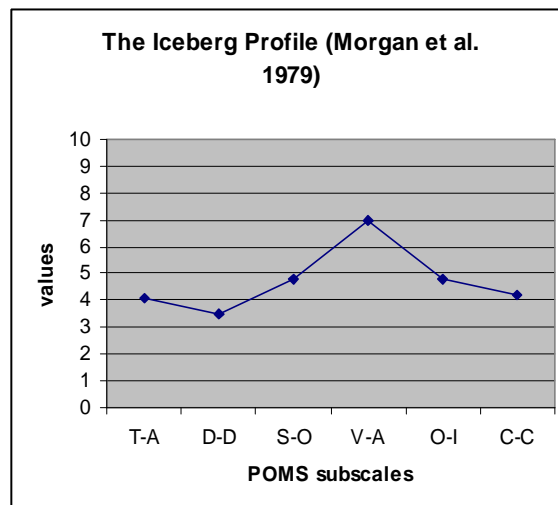
Properly used, hypnosis may be effective in enhancing the suggestibility of athletes. Enhancing suggestibility may lead to cognitive or behavioral adjustments that facilitate performance.

**Active-alert hypnosis** was introduced by Banyai and Hilgard (1976) like a response to reduce the inhibitory effects of traditional relaxation – based induction techniques. The differences between the two types of hypnosis can be summarized as follows: increased alertness, enhancement of positive emotional state and perceptions

of more active participation in active – alert hypnosis as compared with traditional hypnosis (Banyai, 1976). In active – alert hypnosis, verbal suggestions are administered while subject rides a ergometric bicycle.

### The Profile Of Mood States

The Profile of Mood States (POMS) was developed by McNair et. al.(1971, 1981, 1992), using six subscales (tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia and confusion-bewilderment) to assess the mood states of subjects. The POMS is a very well known tool in sport psychology due to Morgan’s (1979) theory regarding the mental health model. According to this model the positive mental health is directly related to high performance and success in sports. Morgan et al. (1979) applied the revised form of POMS (1992) to elite athletes and determined the profile of the successful athlete – the iceberg profile. This profile is characterized by very high score on the vigor-activity subscale and low scores on the other five subscales. The iceberg profile is characteristic to elite athletes; meanwhile the less successful athletes don’t show this typical profile. (Morgan et al. 1979, Terry et al. 1996)



**Fig.1.** The Iceberg Profile (Morgan et al. 1979)

### METHODS

*Subjects:* The present study examined 12 elite athletes (Romanian Judo Olympic Team), age between 18-30 years, all women, who participated and won several medals at international competitions, World Championships and Olympic Games.

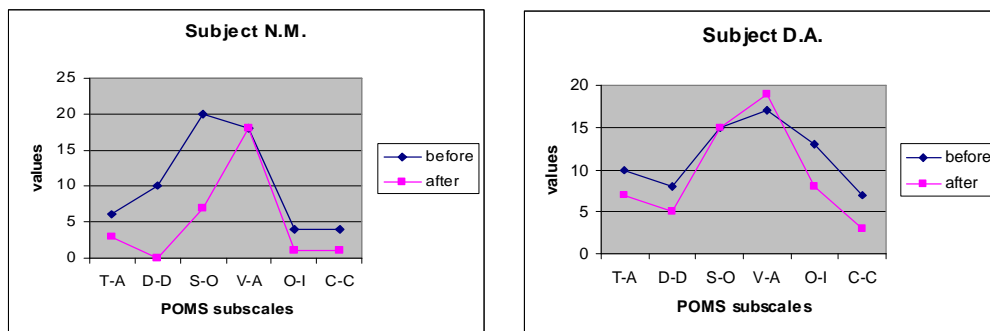
*Design:* The subjects attended one session of active-alert hypnosis and completed the POMS before and after the session, with the instruction “how do you feel NOW”, and they also took part in a structured interview regarding their subjective experiences. The active-alert hypnosis was conducted according to the protocol developed by Bányai (1976) under natural light, using an ergonomic bicycle, with a duration of 40-60 minutes.

The active-alert hypnotic sessions and the structured interview was conducted by the same person in order to avoid certain biases due to the personality of the therapist.

Before and after POMS profiles were compared and interview data summarized.

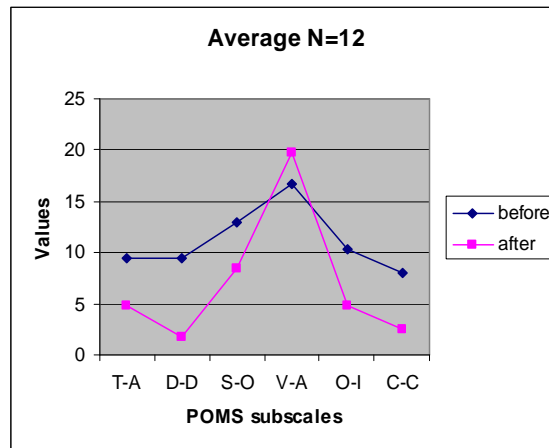
## RESULTS

Figure 2 shows the results of two athletes with the profile before and after the hypnotic session. It can be seen that their profile totally changed. Their state of tension-anxiety, depression, anger, fatigue and confusion diminished meanwhile the state of vigor – activity increased.



**Fig. 2.** The POMS profiles of two subjects before and after the active-alert hypnotic session

The average of all 12 subjects is shown in Figure 3. All 12 subjects showed the iceberg profile after the active-alert hypnosis session. It can be seen the changes in their subjective states, after the hypnotic session.



**Fig. 3.** The average POMS profiles of all 12 subjects

## DISCUSSION

Results showed an impressive change in mood states, change characterized by a high score on vigor-activity subscale and a low score on the other five subscales- similar to the iceberg profile.

Although the POMS profile before the session is similar with an iceberg, due to higher score on vigor-activity, it is not the iceberg profile defined by Morgan (1979) in successful athletes, because all in all it has very high scores on all subscales and a lower score on vigor-activity. On the other hand the profile after the hypnotic session is very similar with the iceberg profile. We must mention that the scores for fatigue-inertia decreased and the score for vigor-activity increased after pedaling for more than 40 minutes constantly. The POMS profile after the hypnotic session is consistent with the subjects' self report during the structured interview taken after the hypnotic session regarding how do the athletes feel. The interview data showed reports of a general good mood, feeling of freshness and activity and rare report of tiredness (although the subjects were pedaling constantly for more than 40 minutes).

The POMS profile and the subjective reports of the athletes show the benefic effects of this technique on their mood states. It helped athletes to reach the mood states which activates their energy and leads them to a good performance.

The results of our study show an impressive change on mood states due to the effects of active-alert hypnosis. We must mention though that we had just a small number of subjects practicing the same sport. A larger sample is needed and we suggest also the investigations of the effects of several active-alert hypnotic session.

Further investigation is needed in order to examine the effectiveness of this technique for all types of elite athletes as well as to develop a self-hypnotic technique which helps athletes to achieve their best performance.

In conclusion, active-alert hypnosis may be integrated as an adjuvant to other sport psychology methods, due to its beneficial effects on mood changes, which leads to the successful athletes' mood states profile.

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## OLYMPIC MEDALLISTS, GRADUATES OF THE PHYSICAL EDUCATION AND SPORT FACULTY, “BABEȘ-BOLYAI” UNIVERSITY OF CLUJ-NAPOCA

RUSU FLAVIA-ILEANA<sup>1</sup>, DEAK GRAȚIELA-FLAVIA<sup>1</sup>

**ABSTRACT.** In almost 50 years of existence, the Physical Education and Sport Faculty (PESF) of the “Babeș-Bolyai” University has a significant number of graduates who later became well-known sport specialists. Some of them became famous as coaches after graduation, others were already known as top athletes when they’ve started to study at the faculty. But the true heroes of our institution are the Olympic medallists: Constantin Tudosie, Simion Schobel, Simona Richter, Gabriela Szabo, Ionela Târlea, Maria Cioncan, and Oana Ban.

**KEYWORDS:** Olympic, medal, athlete, graduate.

**REZUMAT.** Medaliați olimpici, absolvenți ai Facultății de Educație Fizică și Sport din Universitatea „Babeș-Bolyai”, Cluj-Napoca. În cei aproape cincizeci de ani de existență, cursurile Facultății de Educație Fizică și Sport a Universității „Babeș-Bolyai” din Cluj-Napoca au fost absolvite de numeroase personalități ale sportului. Unii au devenit celebri după absolvire ca antrenori, alții erau deja sportivi cunoscuți când și-au început studiile universitare. Însă adevărații eroi ai facultății noastre sunt medaliați olimpici: Constantin Tudosie, Simion Schobel, Simona Richter, Gabriela Szabo, Ionela Târlea, Maria Cioncan și Oana Ban.

**CUVINTE CHEIE:** olimpic, medalie, sportiv, absolvent.

The Olympic movement is a concept difficult to define. Pierre de Coubertin, the father of the Modern Olympic Games, used to say that the Olympic movement is “an element which tends to unite in a bright bundle all the principles which contribute to human improvement”. This concept is not referring only to the development of physical power, but also to the process of building healthy, serene and peace loving individuals. It also encourages the self-knowledge and the development of interpersonal relationships inside a community. All these principles are similar to those who constitute the conceptual and moral foundation of the physical education and sport faculties. Thus, the athletes who participate in the Olympic Games and the graduates of a physical education and sport faculty share the determination of pursuing exceptional results in sport. Those individuals who are both an Olympic athlete and a graduate of a physical education and sport faculty are the incarnation of the Olympic movement concept.

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<sup>1</sup> Babes-Bolyai University; Faculty of Physical Education and Sport Cluj-Napoca; e-mail: flavia\_rusu@yahoo.com

In almost 50 years of existence, the Physical Education and Sport Faculty (PESF) of the “Babeș-Bolyai” University has a significant number of graduates who later became well-known sport specialists. Some of them became famous as coaches after graduation (e.g., Bella Karoly, Simion Schobel, Gheorghe Tadici), others were already known as top athletes when they’ve started to study at the faculty (e.g., Șerban Doboși, Vasile Bogdan, Oana Ban, and others). The true heroes of our institution are the Olympic medallists: Constantin Tudosie, Simion Schobel, Simona Richter, Gabriela Szabo, Ionela Târlea, Maria Cioncan, and Oana Ban.

The first Olympic athlete, chronologically speaking, who graduated from PESF is Constantin Tudosie, a handball player. He was born in 1950, on the 23rd of March, in Leu, Dolj county. He started playing handball in Craiova. Between 1970-1973, as a student in Cluj, he was considered one of the best players of the Universitatea Cluj team. After his graduation, he continued playing handball in Bucharest, at the Steaua team. Selected in the Romanian handball team, he participated at two editions of the Olympic Games: in 1972 in Munchen, where the team won the bronze medal, and in 1976 in Montreal, where they won the silver medal. Another handball player, Olympic medallist and graduate of the PESF, is Simion Schobel. He was born in Sebeș, Alba County, and he also played for the Universitatea Cluj team. He participated in the 1976 Olympic Games in Munchen where he won the bronze medal with the Romanian national team.

Gabriela Szabo (born in 1975, on the 14<sup>th</sup> November, in Bistrița) is one of the best internationally known Romanian track and field athlete of all times. Holder of the European record over 3000 m since 2002, she also holds the most important titles in track and field: European champion, world champion and Olympic champion. She started studying at the Physical Education and Sport Faculty (PESF), “Babeș-Bolyai” University of Cluj-Napoca in 1994. At that time she was still a junior. That same year she won the gold medal in the Junior World Championships in 3000 m, prefiguring an exceptional athletic career. What followed is history. In 1995, she won in Durham, together with the Romanian team, the third place in the World Cross Championships and the title of indoor world champion in 3000 m (Barcelona). Parallel with these results, Gabi was continuing her studies. Those who were her teachers remember her as person with special abilities, ambitious and, despite the fact that she was famous, very modest. Her first Olympic success is the silver medal in 1500 m in the 1996 Summer Olympics (Atlanta). After that came the gold and the bronze medal in the 2000 Summer Olympics (Sydney) in 5000 m and 1500 m, respectively. The year 2001 brings for Gabi the title of world champion in 1500 m and, maybe of the same importance, the university degree in Physical Education and Sport. Today, Gabriela Szabo is the vice-president of the Romanian Track and Field Federation and a PhD student at the National Academy of Physical Education and Sport in Bucharest. The fact that she chose to continue her studies allows us to believe that her first experience with the university environment was a positive one.

Ionela Târlea (born February 9, 1976 in Craiova), another important Romanian track and field athlete, started studying at the Physical Education and Sport Faculty (PESF), "Babeş-Bolyai" University of Cluj-Napoca in the same year with Gabriela Szabo, namely 1994. She is a specialist in 400 m hurdles, but she successfully competed in 400 m flat or in 200 m. Her first international title was the world collegiate champion in 400 m flat conquered in 1999 in Palma de Mallorca (Spain). It followed, in the same year in Maebashi (Japan), the title of world indoor champion in 200 m and the graduation, an event which we like to think contributed to her list of successes. In the 2000 Summer Olympics (Sydney) she finished on the sixth place in 400 m hurdles. She also competed in the 2001 World Championships (Edmonton, Canada) in 400 m hurdles, unfortunately for her with the same outcome: the sixth place. After that she injured herself and could not compete for a while. The comeback meant the participation in the 2002 European Championships in 400 m hurdles with a remarkable result: the gold medal. The following results were all high level ones, but the greatest accomplishment was the silver medal won by Ionela in the 2004 Summer Olympics (Athens) in 400 m hurdles. This medal was the guerdon of a successful athletic career which assured her a place between the greatest names of the international track and field. She is the only Olympic medallist and graduate of PESF who is still competing.

We continue our presentation with yet another track and field athlete, the late Maria Cioncan. She died in a car accident on January 21, 2007, but she will always be alive in our hearts. Her destiny was track and field and she pursued it with great passion, despite all the obstacles she had to overcome. The first one was her parents' wish to follow an accounting career. To understand that we need to know that Maria was born in a modest environment (in a village in the Bistrița-Năsăud county) in June 19, 1977. She started training as a child without a coach or someone to guide her, driven only by her passion for running. Later on she was admitted at the Sports High school in Bistrita. This is how it started, in 1991 in Bistrita, the athletic career of a future Olympic medallist. Her first coach was Zsolt Gyongyossy. In 1993, after her first medals as a junior, problems start to appear. Gyongyossy refuses to continue to train her and Maria stops competing. In 1996, she starts again, this time with Ștefan Beregszaszi as a coach. She conquers the Balkans champion title in 800 m and 1500 m three times and the national champion title in 800 m, 1500 m and 3000 m five times. She starts studying at PESF in 1999 and she graduates in February 2004. She also obtained a Master degree one year later, issued by the same university. 2004 was THE year for Maria Cioncan. It was the year of the Summer Olympics (Athens) where she competed in 1500 m and where she finished on the podium, with the bronze medal. The same year brings national recognition for Maria. She was awarded with the Merited Master in Sport title by the Romanian authorities. She had everything to live for when a last obstacle came into her way and took her life.

Changing sport to judo, the next athlete to be presented is Simona Richter, bronze medallist in the 2000 Summer Olympics (Sydney), in 78 kg category. She became an accomplished athlete under the guidance of Florin Bercean, the coach of the national female judo team. Her athletic career lasted 15 years, years of intensive training and competing at the highest levels. A part of this career were also the injuries which finally lead to her withdrawal from professional sport. Two years after her official withdrawal, her greatest dream became real. She started working as a coach in the same place where she trained for so long, namely in Cluj-Napoca, where the national female team trains. She graduated from the Physical Education and Sport Faculty (PESF), "Babeș-Bolyai" University of Cluj-Napoca in 2000, the same year of her Olympic success. At this point, having both Maria Cioncan and Simona Richter as examples, we wonder if there is a connection between winning an Olympic medal and graduating from university? There must be one since two great female athletes succeeded in accomplishing both in the same year. Nowadays, Simona Richter is busy training the future female champions in judo. Knowing her professionalism, her intelligence and her extraordinary work capacity, we have no doubt in our mind that she will be as successful as a coach like she was as an athlete.

We will end our presentation with the only Olympic medallist who graduated from PESF and was born in Cluj-Napoca. Her name is Oana Mihaela Ban, and although she is now retired, she remains one of Romania's top world-class gymnasts. Born on January 11<sup>th</sup>, 1986, she competed for the first time in a National Championship as a junior, in 1998, where she won the floor exercise event. The following year, she joined the Romanian national team, and began working with coaches Octavian Bellu and Mariana Bitang. Results like a first-place finish at the Top Gym tournament in Belgium and a bronze medal at the 2001 European Youth Olympic Days confirmed her as an elite gymnast. In 2002 she made her international senior debut. At the 2002 World Artistic Gymnastics Championships in Debrecen, Oana won a silver medal on the balance beam. In 2003, she contributed strongly to the Romanian team's silver medal at the 2003 World Artistic Gymnastics Championships and placing fifth in the all-around final. The highlight of her career was the gold medal won with the Romanian team in the 2004 Summer Olympics (Athens). Although an excellent gymnast, her ambitions went beyond sport. She did not sacrificed all to sport. A good student in school, Oana decided, in 2004, to retire from gymnastics and to pursue her education. She was one of the best students of her generation at the Physical Education and Sport Faculty (PESF), "Babeș-Bolyai" University of Cluj-Napoca. She graduated this summer, in June 2008, and she would also like to attend one of the faculty's master courses starting this fall. One of Oana's most dear dreams is to work with children, most probably as a coach. We wish her good luck with everything and to have the chance of working with talented little girls, at least as talented as she was.

These are our Olympic medallists. As we speak, other graduates of our faculty are competing in the 2008 Summer Olympics (Beijing). They are: Anamaria Pavăl and Rareș Chintăoan – wrestling; Carmen Amariei, Florina Bârsan and Mihaela Senocico – handball; Nicoleta Grasu, Ionela Târlea and Felicia Țilea-Moldovan – track and field. We wish to all of them lots of success.

## IS ENERGY AVAILABILITY THE CORNERSTONE OF THE FEMALE ATHLETE TRIAD?

DEAK GRAȚIELA-FLAVIA<sup>1</sup>

**ABSTRACT.** The female athlete triad is a syndrome known since 1992. At that time, the syndrome was defined as a cluster of three clinical conditions: disordered eating, amenorrhea, and osteoporosis. As a consequence of almost three decades of research, the female athlete triad is now seen as an intricate network of relationships among energy availability, menstrual function, and bone mineral density. Energy availability, defined as “dietary energy intake minus exercise energy expenditure”, seems to have a central role in the Triad. A significant amount of studies certifies the fact that low energy availability is the main cause for functional hypothalamic amenorrhea in female athletes. Moreover, there’s prove that low energy availability has an impairing role in bone development. Based on the existing scientific evidence, this article is aimed at establishing the importance of energy availability for the female athlete triad.

**KEYWORDS:** female athlete, energy availability, interrelationships, amenorrhea, bone mineral density.

**REZUMAT. Este disponibilitatea energetică componenta de bază a triadei femeii sportive?** Triada femeii sportive este un sindrom cunoscut încă din 1992. Pe vremea aceea, sindromul era definit ca un grup format din trei componente: tulburări de alimentație, amenoree și osteoporoză. Consecință a trei decenii de cercetare în domeniu, triada femeii sportive este considerată, la ora actuală, o complicată rețea de legături între disponibilitate energetică, funcție menstruală și densitate minerală osoasă. Disponibilitatea energetică, definită ca “aport energetic adus de regimul alimentar minus consum energetic asociat exercițiului fizic”, pare să aibă un rol central în cadrul triadei. O cantitate semnificativă de studii certifică faptul că disponibilitatea energetică scăzută este cauza principală a amenoreei la sportive. Mai mult, există dovezi că disponibilitatea energetică scăzută are un rol inhibitor în procesul de dezvoltare osoasă. Scopul acestui articol este acela de a stabili importanța disponibilității energetice pentru sindromul triadei femeii sportive.

**CUVINTE CHEIE:** sportivă, disponibilitate energetică, interrelații, amenoree, densitate minerală osoasă.

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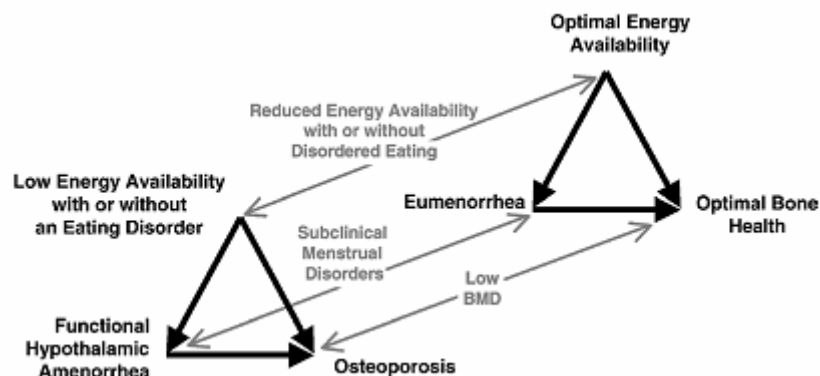
<sup>1</sup> Babes-Bolyai University; Faculty of Physical Education and Sport Cluj-Napoca; e-mail: gratiela\_flavia@yahoo.com

### THE TRIAD: INITIAL VERSUS LATEST DEFINITION

Although the American College of Sports Medicine (ACSM) released its first Position Stand on the female athlete triad in 1997, the syndrome was known since 1992, when “an association of disordered eating, amenorrhea and osteoporosis seen in activities that emphasize a lean physique was recognized as the female athlete triad” (5). At that time, things were still pretty uncomplicated and any female athlete who exhibited all three clinical conditions (disordered eating, amenorrhea and osteoporosis) simultaneously was diagnosed with the Triad’s syndrome. Then, step by step, as science progressed and the knowledge on the triad became more accurate, the situation changed. Scientists realized that they are dealing with a “serious syndrome” (3), which can “decrease physical performance” (2) and can even cause “morbidity and mortality” (2). They understood that there was an imperative need for action, so they published the first position stand on the Triad. The purpose of the ACSM Position Stand was, as declared by its authors, “to warn female athletes against the hazards of under-nutrition” (6). By “hazards” it was understood the interrelated components of the Triad, which were disordered eating, amenorrhea and osteoporosis (2). The greatest breakthrough of the 1997 position stand was the acknowledgement of the fact that the female athlete triad was no longer “a syndrome consisting of three necessary components” (4). It became a syndrome which comprised the “existence of one or more components of the female athlete triad, alone or combination” (7). This definition was the starting point of a complex process of scientific polemics which lasted ten years and was concluded with the release of the second position stand on the Triad.

Somewhere along this sinuous road, scientists decided that it was the time for yet another change. In 2005, after recognizing that the three components of the Triad have been specified too narrowly (1), the authors of the 1997 position stand presented a new approach of the problem based on energy availability. The Triad was understood “to comprise inter-related spectrums of energy availability, menstrual function, and bone strength, ranging from health and disease” (1).

Two years later, the American College of Sports Medicine released its second Position Stand on the female athlete triad. It was an updated version of the 1997 Position Stand. The new, improved definition of the female athlete triad refers to “the interrelationships among energy availability, menstrual function, and bone mineral density, which may have clinical manifestations including eating disorders, hypothalamic amenorrhea, and osteoporosis” (5). Figure 1 describes the interrelated spectrums of energy availability, menstrual function, and bone mineral density along which female athletes are distributed.



**Figure 1.** The interrelationships among the Female Athlete Triad's components [after (5)]

Based on this representation, a female athlete's condition is a dynamic one. It moves between the two ends of the spectrums, which represent the pathology (the triangle in the lower left corner of Figure 1) and the healthy condition (the triangle in the upper right corner of Figure 1), according to her dietary intake and training regimen. Energy availability, defined as "dietary energy intake minus exercise energy expenditure" (5), seems to be the mediator factor for the conditions of the female athlete triad. Low energy availability has an impairing role in bone development by suppressing the hormones that promote bone formation (5). Low energy availability also induces amenorrhea (absence of menstrual cycles for more than 90 days), which means low estrogen level, which also means no restraint on bone resorption (5). Assuming that low energy availability is the triggering factor for both menstrual disorders and bone resorption, the purpose of this article is to present the existing data on energy availability and to discuss the role of energy availability for the Triad.

### ENERGY AVAILABILITY: THE SCIENTIFIC EVIDENCE

Athletes rely on energy expenditure in order to fulfill the various demands of their sport. Exercise energy expenditure is defined as the amount of energy, measured in kilocalories or kilojoules, consumed by the physiological functions of the human body during exercise training. Energy intake is the total amount of kilocalories or kilojoules resulted from adding the energetic values of all dietary nutrients ingested. Energy availability is the result of the subtraction between dietary energy intake and exercise energy expenditure. Practically, energy availability is the energy left to be used by the body functions after exercise training. The mathematical formula for calculating energy availability (EA) is the following:  $EA = (EI - EEE)/FFM$ , where EI means dietary energy intake, EEE means exercise energy expenditure and FFM means

fat-free mass (5). EA is measured in units of kilocalories or kilojoules per kilogram of fat-free mass. For example, for a dietary intake of 1500 kcal/day, an exercise energy expenditure of 600 kcal/day, and a fat-free mass of 53 kg,  $EA = (1500 - 600)/53 = 16.98$  kcal/kg FFM/day.

Energy balance is reached when dietary energy intake is able to compensate for exercise energy expenditure. For young adults, energy balance occurs at an energy availability of about 45 kcal/kg FFM/day (1). Energy balance can be disrupted either by decreasing dietary energy intake, or by increasing exercise expenditure, or even both. When energy imbalances occur in female athletes, they get exposed to health risks such as menstrual disorders and low bone mineral density.

The hypothesis that negative energy balance is causally linked to the suppression of reproductive function in female athletes emerged in 1980 (8). Throughout the 80's, this particular topic was treated with interest in the scientific community and an important number of studies dealt with estimating the energy balance of young exercising women. The results of these studies were mostly in favor for the finding that "energy deficits are greater in athletes than in sedentary women" (8). Further, most studies certified the fact that amenorrheic athletes have a lower dietary energy intake compared to eumenorrheic athletes of the same size, body weight and training level (8). The greatest accomplishment of the 80's regarding this topic belongs to Bullen et al. (9) who, in 1985, performed an experiment on untrained women. The experiment was designed to induce menstrual disorders through progressive exercise training in two groups of subjects who were fed differently. One group was fed to maintain body weight, and the other group was fed to lose one pound of body weight per week (6). To say that the results were dramatic is an understatement: 24 out of a total of 28 subjects were reported with clinical menstrual disturbances ranging from abnormal bleeding to delayed menses during the 2-month period of the study (8). Bullen et al. (9) were successful in proving the hypothesis that exercise training has a disruptive effect on the reproductive function, but they have failed in explaining the mechanism by which this has happened. Back then, the common belief was that stress associated with exercise, rather than energy cost, was the main factor in disrupting the female reproductive function (6). It would take another decade to prove that low energy availability is the main cause for altered reproductive function in exercising women (10, 11).

At the beginning of the 90's, it was clear that ovarian function was dependent on luteinizing hormone (LH) pulsatility (12). The next challenge scientists faced was to determine the effects of energy availability and exercise stress (which was everything linked to exercise, except energy cost) on luteinizing hormone pulsatility in the follicular phase of the menstrual cycle. The study performed by Williams et al. (10) on four moderately trained eumenorrheic women in 1995 had the main objective to monitor LH pulse parameters over three successive menstrual cycles. They have found "a significant decrease in overall LH pulse frequency" associated with diet and exercise compared with treatments of normal feeding and no exercise and treatments of normal

feeding and exercise (10). The conclusion was that exercise-induced changes in LH pulse frequency are dependent on caloric intake rather than on training habits (10). These results were confirmed three years later by Loucks et al. (11) with a study designed to test two hypotheses. They were set out to determine which of the two factors most associated with exercise (energy availability and stress) was really responsible for the disruption of luteinizing hormone (LH) pulsatility. Not surprisingly, they have found only one hypothesis to be true: "LH pulsatility in women depends on energy availability" (11).

A different approach of exercise-induced menstrual disturbances in female athletes would be the study of endocrine and metabolic adaptations as a result of exercise training. Dr Loucks et al. (11, 13-16) have made a career out of identifying and explaining the mechanisms by which exercise affects the female reproductive function. In 1989, Loucks et al. (13) found suppressed luteinizing hormone pulsatility and ovarian follicular development in amenorrheic athletes. In 1992, the same group of scientists observed alterations of the hypothalamic-pituitary-thyroidal axis (H-P-T) in women athletes when compared with sedentary women (14). A reduction of the circulating thyroid hormone in athletes, both eumenorrheic and amenorrheic, was also noticed, but the most important finding was the significantly lower serum concentrations of T3 and T4 hormones seen in amenorrheic athletes when compared with eumenorrheic athletes (14). Although the mechanisms underlying this phenomenon is still unknown, these findings tell us that chronic high volume athletic training *per se* does not alter the H-P-T axis, but when associated with amenorrhea, the H-P-T function steps out of its normal parameters (14). Subsequently, Laughlin and Yen (17, 18) reported neuroendocrine-metabolic adaptations in female athletes as a result of exercise training. They have provided solid evidence in favor of the existence of a hypometabolic state induced by exercise in both eumenorrheic and amenorrheic athletes (17). Alongside this hypometabolic state were observed, only in amenorrheic athletes, endocrine and metabolic alterations such as decreased body temperature, a decreased ratio of IGF-I / IGF-binding protein-1, reduced plasma glucose, an accelerated GH pulse frequency, increased insulin sensitivity, and elevated cortisol levels (17). The authors concluded that athletes, as a result of systematic training, develop a series of specific glucoregulatory adaptations meant to manage metabolic fuels for the conservation of protein (17). In summary, these studies demonstrate that exercise training induces in female athletes endocrine adaptations similar to those associated with chronic undernutrition. These adaptations seem to be more profound in amenorrheic than in eumenorrheic athletes (8).

So far, the studies cited in our attempt to present the interrelationships among energy availability and menstrual function were human studies. Most of these studies are cross-sectional, and although they advocate the theory that low energy availability has a causal role in exercise-induced amenorrhea, the data they provide "must be viewed with caution" (4). The best they can do is to indicate an existing correlation between negative energy balance and menstrual disorders. Fortunately, we have animal

studies to rely on for solid evidence of the fact that negative energy balance causes menstrual dysfunctions. In 2001, Williams et al. (19) designed an experiment based on a non-human primate model. They used eight adult female cynomolgus monkeys to test the hypothesis that exercise-induced amenorrhea is caused by increased energy expenditure occurring with exercise, and not by other aspects of exercise (8). The study is relatively similar to that performed by Bullen et al. (9) back in 1985. Both studies focus on inducing amenorrhea by gradually increasing energy expenditure through strenuous exercise training. There are a few differences though, beside the obvious one that Bullen et al. (9) used human subjects and Williams et al. (19) used monkeys. The first one would be that the non-human subjects of Williams et al. (19) were introduced more gradually in the training regimen than the human subjects (8). The second difference can be considered the fact that the monkeys did not lose as much weight as the women did throughout the development of the study (8). Despite these differences, the results of the two studies were pointing out the same conclusion. Williams et al. (19) confirmed without any doubt the major role played by low energy availability in inducing menstrual disorders. In the years to come, scientists have succeeded in identifying the threshold of energy availability below which LH pulsatility is disrupted and menstrual disorders appear. This value is about 30 kcal/kg FFM per day (16).

Although estrogen deficiency is the primary cause for osteoporosis in postmenopausal women, in the case of amenorrheic athletes the same deficiency does not seem to have such an important role (5). In fact, when estrogen was replaced in premenopausal women with hypothalamic amenorrhea, their bone mineral density (BMD) was not fully restored (1). The reduced rate of bone formation specific to amenorrheic athletes is associated with chronic undernutrition (20) rather than with estrogen deficiency. A randomized clinical trial performed by Ihle and Loucks (21) in 2004 revealed increased rate of bone resorption and decreased rate of bone formation within 5 days after energy availability was reduced below the threshold of 30 kcal/kg FFM per day in exercising women (21). The cause for the decline observed in the rate of bone formation proved to be disrupted bone formation regulating hormones (insulin, T3 and IGF-I) (21). So low energy availability suppresses bone formation by affecting the normal function of hormones like insulin, T3, IGF-I, and even cortisol and leptin (5). A very recent study was aimed at assessing the independent and combined effects of energy deficiency and estrogen deficiency on bone turnover markers in exercising women (22). Apparently, when the energy balance of exercising women was not disrupted, there were no perturbation of bone formation or resorption, regardless of estrogen status (22).

## DISCUSSION AND CONCLUSIONS

Energy availability (EA), defined as “dietary energy intake minus exercise energy expenditure” (5), is the energy left to be used by the body functions after exercise training. The value of EA at which energy balance occurs in young adults is about 45 kcal/kg FFM/day (1). Some female athletes, mainly those who practice

aesthetic sports, have eating habits which provide only 20 or even 10 kcal/kg FFM/day. For various reasons (e.g., to maintain a required body shape, to enhance performance, to enter a weight category), energy restriction is encountered quite often in sport, not always with beneficial results for athletes' health. In fact, energy restriction is associated with menstrual disorders and low bone mineral density (BMD) in female athletes.

The most common menstrual disorder seen in athletes is functional hypothalamic amenorrhea. This type of amenorrhea is caused by the pituitary gland's failure to secrete luteinizing hormone (LH) at the correct frequency (5). The disruption of LH pulsatility was thought to be a consequence of an association of factors like stress, nutrient deficiencies and low body weight or low body fat. But amenorrheic and eumenorrheic athletes have a range of body composition similar to that of non-exercising women, so proportion of body fat can hardly be considered responsible for the modifications of LH pulsatility (1). Stress was ruled out as an important factor by the same studies which proved the causal relationship between low energy availability and disrupted LH pulses (10-12). So it all comes down to energy balance, a physiological state reached when energy intake is able to compensate for energy exercise expenditure. Or, to be more precise, to negative energy balance (*i.e.* a deficit in energy intake relative to energy expenditure (8)). Although there might be a small contribution to the cause of exercise-induced menstrual disorders from factors like stress or low body fat, existing evidence points out negative energy balance as the primary cause of exercise-induced reproductive dysfunctions.

Several different types of studies performed on humans proved that energy deficits resulted from strenuous training trigger a cascade of physiological changes which lead to a disruption of the normal reproductive function. Numerous cross-sectional studies presented, for the first time in the 80's, the reality on caloric intake of exercising women. These women were reported to have a lower dietary energy intake when compared to sedentary women. Moreover, the amount of calories consumed by amenorrheic athletes was found to be inferior to that consumed by eumenorrheic athletes of the same size, body weight and training level (8). These findings suggest a chronic exposure of female athletes in general, amenorrheic athletes in particular, to a state of low energy availability.

Short-term prospective studies (10, 11) have shown that LH pulsatility can be disrupted in women by exercise, and that this process can be reversed by adequate food intake. These studies proved that clinically induced and transient decreases in energy availability of both 57% (from 45 to 20 kcal/kg FFM/day) and 78% (from 45 to 10 kcal/kg FFM/day) provoked a blunting of luteinizing hormone pulse frequency (4). One study showed that after only one day of increased feeding, LH pulse frequency increased significantly (11). As such, exercise-induced short term changes in energy availability have a direct and immediate effect on circulating levels of reproductive hormones (8). The limitation of this

conclusion is the fact that it cannot be extended to a greater level. We cannot assume that the same mechanisms are responsible for completely suppressed reproductive function after strenuous training (8).

The reproductive function depends on gonadotropin-releasing hormone (GnRH), which is reflected by LH pulsatility (1). The studies dealing with the effect of energy availability on GnRH pulses are pointing to plasma glucose as the key mediating factor (1). Athletes were found to have decreased body temperature, a decreased ratio of IGF-I / IGF-binding protein-1, reduced plasma glucose, an accelerated GH pulse frequency, increased insulin sensitivity, and elevated cortisol levels (17) as a result of chronic training. It was also proved that glucoregulatory hormones maintain normal concentrations of plasma glucose only above a threshold of energy availability of about 30 kcal/kg FFM/day (1).

All scientific evidence existing so far on the relationship between energy availability and menstrual dysfunctions in female athletes lead to the following statement: “exercise has no disruptive effect on menstrual function apart from the effect of its energy cost” (1). There is not one single study that we know of to prove otherwise. Of course, the mechanisms behind the disruption of LH and GnRH pulsatility as a result of energy deficits are still unknown, and there is still a great deal of work to be done in this area, but this must not minimize the importance of the finding that low energy availability is the main factor contributing to changes in reproduction function.

Bone loss in amenorrheic athletes was originally thought to be a consequence of hypoestrogenism (1). Clinical trials designed to replace the estrogen deficit in premenopausal women with hypothalamic amenorrhea proved otherwise. The results of such trials revealed that bone density in premenopausal women with hypothalamic amenorrhea was not fully restored after estrogen supplementation (1). The cause for low rates of bone formation specific to amenorrheic athletes was to be searched elsewhere. Scientists ended up testing the same hypothesis as in the case of exercise-induced menstrual disorders. Different studies (20, 21, 22) provided evidenced in favor of the fact that low energy availability (below the threshold value of 30 kcal/kg FFM/day) suppresses the activity of metabolic hormones responsible for bone formation. In conclusion, the same changes in energy availability responsible for menstrual disorders are also responsible for bone loss in female athletes.

According to the 2007 ACSM Position Stand on the female athlete triad, “low energy availability appears to be the factor that impairs reproductive and skeletal health in the Triad” (5). After more than two decades of research, scientists have reached a point where they all agree on the importance of low energy availability for the female athlete triad syndrome. Being founded on the interrelationships of three major factors, the Triad would not exist if it weren't for the energy deficiencies related to strenuous exercise. Like in a vicious circle, it all starts and ends with low energy availability. Energy availability can be considered the cornerstone of the female athlete triad.

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## **BECOMING A REFLECTIVE PRACTITIONER IN PHYSICAL ACTIVITY AND SPORT. A NEW CHALLENGE FOR SPORT PEDAGOGY**

**EMANUELE ISIDORI<sup>1</sup>**

**ABSTRACT.** The complexity of sport in contemporary society requires the development of a methodology that allows physical activity (PA) and sport professionals to develop a critical and reflective attitude towards the theoretical and practical problems they face in their profession. Sport pedagogy, applying Donald Schön's model of reflective practitioner, can help professionals of sport sciences (coaches, educators, personal trainers, physical education teachers, etc.) to reflect upon their practice recognizing and understanding its general aims, values and justifications. This critical reflection can be the starting point for developing a new ethical, educational and epistemological outlook on sport professions and their sciences.

Reflecting and thinking about physical activity and sport values, about their ethical and moral problems, sometimes about the implications of their practice, is very important for the professionals of sport sciences (Gilbert and Trudel, 2006). This reflective and critical practice helps physical activity professionals to develop into intellectuals/educators as opposed to being technicians merely (Ball, 1995).

We can define reflective and critical practitioners those who:

- 1) look back on their work, actions and consequences (their teaching and their pupils learning, for educators) and reconstruct what happened and why;
- 2) propose alternatives and take into account the social, moral and political contexts that surround their actions, or teaching and schooling.

Professionals who can and know how to reflect on their own practice are more likely to enhance their professional development than those who cannot do it.

This reflection needs, first of all, to be guided and then to know what aspects of action to reflect upon. Therefore it is important to provide a knowledge base of values, goals, content and educational practices within which professionals can locate their reflections. These professionals will also need guidance on how to go about reflecting on their practice.

The advantages of reflective practice is that (Laker, 2001):

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<sup>1</sup> University of Rome "Foro Italico", Faculty of Movement Sciences;  
e-mail: emanuele.isidori@iusm.it

- 1) it is entirely context-specific;
- 2) it is not abstract theory that does not appear to have any practical application.

Reflective practice requires professionals of physical activity and sport to question their values and their practice. The reflective and critical physical activity and sport practitioners are those who know *what* they are doing and *why* they decided to do it and then review the effect of what was done (*how* this happen). the adjective “critical” comes from the old Greek verb “kríno” that means “to judge”, “to have an opinion”, “to estimate/evaluate” and “ to decide”.

Reflection needs to be focused on problems of physical activity and sport perceived as controversial by answering specific and pragmatic questions, for example:

- Whose values (social, moral, educational, etc.) am I promoting through sport and physical activity?
- What kind of benefits come to people from my action?
- How can I organize in the best way my action in order to promote the values of my profession?
- When I don’t promote these values?
- Which perspective I assume about PA and sport (medical, biological, pedagogical, sociological, etc.)?
- Which advantages or disadvantages derive from the perspective I assume?
- Am I really free in my work or am I conditioned by the images that modern society creates about Sport and PA (competitive, male, capitalistic, obsessed by health, performance, etc.)?

By asking yourselves deep, probing and sometimes personal questions about your practice and your existence as practitioners of PA and Sport, you are exposing yourselves to the possibility you might not like, or feel comfortable with, the answers you give. This self-analysis can expose deep-seated prejudices and unfounded theoretical or practical assumptions

In his model of reflective thought, saying that we learn from experience and practice, the american philosopher and educationist John Dewey (1933) identified five phases or states of thinking:

- suggestions
- problem
- hypothesis
- reasoning
- testing

Each phase is contextualized by past and future actions and experiences and some might be expanded or overlap, depending on the nature of the problem.

These phases don't need necessarily link in any particular order. But when they are pieced together they form a process of reflective thinking. This process involves:

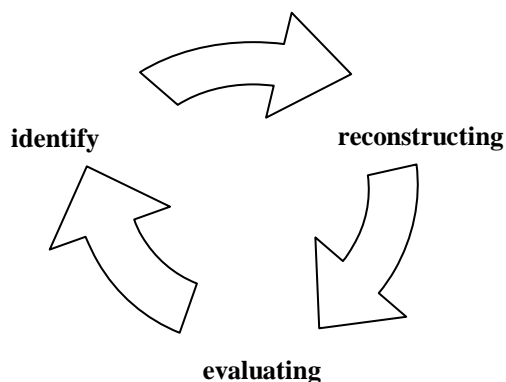
- a) a state of doubt, hesitation, perplexity, mental difficulty, in which thinking originates;
- b) an act of searching, hunting, inquiring, to find material that will resolve the doubt, settle and dispose of the perplexity.

Dewey considered that attitudes of open-mindedness, whole-heartedness and responsibility are very important in the use of reflection.

Boud (1985) considers reflection to be an activity in which people recapture their experience, think about it, mull it over and evaluate it. He includes the dimensions of feelings and emotions and reconfigures Dewey's five phases in three:

- 1) returning to experience;
- 2) attending to or connecting with feelings;
- 3) evaluating experience:

We can resume the phases of *critical thinking* through this circle (Bowell and Kemp, 2006):



that means: identify a problem; reconstructing experience and problem so as to express it clearly and evaluating to perform and justify values and actions.

Schön (1983; 1987) built on and extended Dewey's work on the properties of reflection. He suggested that the capacity to reflect on action so as to engage in a process of continuous learning is one of the defining characteristics of professional practice. According to this author, knowledge gained from the practitioner's own experience through reconstructing experience.

Schön distinguished between two fundamental processes:

- 1) reflection *in* action, while doing something, in the midst of performance;

- 2) reflection *on* action, after having done something.

The purpose, rationale and justification for all this reflection is to improve effectiveness of your practice as PA and Sport practitioners in order to maximize learning, care and health opportunities that you provide for people (child, elderly, disabled etc.). Reflecting on their practice, PA and Sport practitioners can understand: aims, values and give justification to their own practice. This process is very important to understand the meanings of this particular field of human knowledge.

It can be useful to try to explain the concept of aims, values and justifications in sport and PA (Whitehead, 2006).

- a) *Aims* are statements of our intended goals. They answer the question «why are we carrying out this practice?».
- b) *Values* answer the question «what is the point of carrying out this practice?». A value describes the benefit to be gained from a particular activity.
- c) *Justifications* respond to the question «can you persuade me that the value you attribute to the practice is worthwhile?». A justification therefore goes a step further and explains why the claimed benefits is desirable.

In relation to physical activity and sport these questions could be:

- a) *Aim*: why are we doing physical activity and sport?  
answer: to promote skilful body management.
- b) *Value*: what is the value of promoting skilful body management?  
Answer: to help pupils (or the elderly, adults, the disabled, etc.) to be coordinated and be able to control their body.
- c) *Justification*: why is this a valuable thing to do?  
Answer: as humans we need to be able to function effectively physically not only to carry out activities in our daily life with ease but also give us the opportunity to take part in the wide range of physical activities available in our culture.

There are three different types of values in sport and Physical activity (Isidori, 2008):

- 1) pure values
- 2) mixed values
- 3) anti-values

Examples of pure values in PA and sport are: friendship, peace, democracy; of mixed ones: health competition and victory. Anti-values are those that conflict with pure values, e.g., violence, egoism, hatred and enmity (Morgan, 2006).

A mixed-value in PA and sport is a value that depends on the context in which it is promoted (it can be or not a value). For example, health as mixed value: it is a

value when it helps human life to improve in quality (physically, emotionally, socially, etc.); it is an anti-value when it is an obsession for a perfect body that becomes narcissism and egoism (the only thing important is me, my body and wellbeing).

But one complication in debating aims, values and justifications is that there could be an underlying misunderstanding about the subject under debate. For example, some people find it difficult to differentiate between physical education/ activity and sport. Others see both physical activity and sport as forms of recreation. How people understand the meaning of a term influences their view of its value.

For these reasons you need to be clear about the meanings of different terms. While everyone else may not agree with you, you as reflective practitioner need to know and be able to state what you understand by a particular term. The way terms are used is often differentiated by the following:

- Who is taking part?
- What activities are been undertaken?
- Where the activity is occurring?
- Why the participants are taking part?
- What is the purpose of the activity?

We must remember that there will never be one specific definition. It is fundamental for a PA reflective and critical practitioner to know to what he is referring and can recognize if there are misunderstandings between people about his practice.

Another important thing is to recognise that there are two types of aims in PA:

- 1) those which are unique to PA and Sport, *intrinsic* to these subjects and practices and see PA and Sport as ends in themselves
- 2) those which these practices share with other aspects of the human learning, and are *extrinsic* to PA and Sport and use them to broader social, psychological or educational goals.

An example of performing an action as an *end in itself* or as a *means to other ends* can be given in relation to eating food. One can eat food simply to provide enough energy and nutriment to support your daily lifestyle. In this case, eating is an *end in itself*. However, if you eat particular foods either to build muscle or stamina or simply for pleasure, the action has an *extrinsic purpose* beyond enabling you to live your habitual lifestyle. For example, weight training would support muscle development and watching a film could give pleasure.

In PA and Sport there are aims that are *ends in themselves* and *means to other ends* and it is important for professionals to understand this exact difference. However it is not easy to understand the exact nature of each aim of PA and Sport because physical activity and sport are much more than some activities related to the physical part of a person. They contribute to our emotional, social and personal (or affective) selves, our spiritual and community selves; in short to the development of the whole person.

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## THE FIRST STEPS OF PHYSICAL EDUCATION IN CLUJ

KILLYÉNI ANDRÁS

**ABSTRACT.** In 1868, the Minister of Education laid down the basis of physical education in Hungary and in Cluj. Shortly after this, in 1872 the first gym was erected in Cluj. The city council made a contract with the Sports and Fencing Association, who owned the gym, according to which the association would provide the local secondary schools with school sports teacher and gym. The most remarkable sports teacher was Károly Albert, also an outstanding athlete and cyclist. From 1896 the local schools began to hire sports teachers and started to build their own gyms. Illustrious sport teachers like Károly Albert, Gyula László, Sándor Varga and László Gerentsér taught in the schools of Cluj. The students from the local university had the opportunity to practice sports at the Athletic Club of Cluj and at the University Athletic Club of Cluj. István Somodi had won the Olympic silver medal as a sportsman of the University Athletic Club.

**Keywords:** physical education, sport teacher, Károly Albert, Gyula László, Sándor Varga, László Gerentsér, university sports life

**REZUMAT.** Primii pași ai educației fizice în Cluj. Începând din 1868 în Ungaria și în Cluj s-au pus bazele predării educației fizice în școli. În 1872 asociația sportivă locală a construit în Cluj prima sală de sport, iar conducerea orașului a semnat un contract cu proprietarul sălii de sport, contract conform căreia asociația de sport închiriază sala de sport și angajează profesor de educație fizică pentru liceele clujene contra unei sume lunare. Profesori iluștrii, recunoscuți pe plan național au predat în Cluj în acea vreme: Károly Albert, Gyula László, Sándor Varga, László Gerentsér. Pe lângă elevi și studenții universității clujene au avut posibilitatea de a se antrena în cadrul Clubului Athletic și al Clubului Athletic Universitar. Dintre sportivii universitari amintim pe Ștefan Somodi, medaliat cu argint la jocurile olimpice de la Londra, 1908.

**Cuvinte cheie:** educație fizică, profesor de sport, Károly Albert, Gyula László, Sándor Varga, László Gerentsér, sportul universitar

### School reform and its impacts in Cluj

After the compromise of 1867, Minister of Education József Eötvös made the first steps in settling the question of physical education. The new law added physical training to the list of compulsory school subjects: physical education is compulsory school subject in communal public elementary schools, with regard to military training. Paragraph 24 of the above mentioned law regulated physical

training in schools: Aim: to develop every part of the body subserviently with regular physical training and preferably to intensify physical strength as well as to foster skills and abilities in it's functioning by these.<sup>1</sup>

According to the new regulations, the training of sports teachers started as well. This can be identified at the beginning of the 1870s when the training of the so called "school sports teachers" for teaching physical education in schools started. According to decree No 11913 issued on 5<sup>th</sup> of July 1871 by the Minister of Education the training and system of examination of "school sports teachers" was decided. This training was provided by the National Sports Association; the first person to obtain a qualifying certificate was Ignác Horváth. By 1875 19 courses had been organized, with 449 candidates, of which 359 were examined and 280 received qualifying certificate: 24 for association, 78 for high school, 68 for secondary school and 110 for elementary school education.<sup>2</sup>



**The first gym in Cluj**

In 1883, according to a decree issued by Minister of Education Ágost Trefort physical training was added to the list of compulsory school subjects in comprehensive schools as well. In spite of all these positive steps, the new school subject was more disciplinarian than physically training. Only 5 % of the schools had trained sports teachers and suitable gyms, in most of the cases teaching physical education was undertaken by school teachers, teachers with military history and school attendants. Often a school would contract a local association which would allow students to practice physical training in its premises under the supervision of the association's overseer, charging the school a certain amount for it.<sup>3</sup>

<sup>1</sup> Killyéni A., Killyéni P., Sports History of the Reformed Theological High School of Cluj, Cluj, 2004

<sup>2</sup> Siklóssy L., One Thousand Years in the Hungarian Sport, III, Budapest, 1929

<sup>3</sup> Szikora K., History of the Hungarian Youth's Physical Education, Budapest, 2004

Analyzing the contemporary ambitions of Cluj, we can see that all the above efforts are valid. Gyms and school sports teachers didn't exist after the school reform, thus physical education in school hadn't existed before 1872 when the modern building of the Sports and Fencing Association was erected. The city council made a contract with the association, according to which the association would provide the local secondary schools (Catholic, Reformed and Unitarian secondary schools, the higher elementary school as well as the teacher training school) with school sports teacher and gym, thus beginning with the 1872/73 school year, physical education started in Cluj. This contract was in force until 1896<sup>4</sup>.

A great advantage in the employment of the education law was that the local school sports teachers were sportsmen and sports overseers, thus physical education was more educational. An example for this is school sports teacher Károly Albert, who was an outstanding athlete and cyclist.

### **Károly Albert**

Albert was born in Cluj in 1858. He graduated the teacher training school for boys, and later got a degree at the National Sports Association in Budapest, as a school sports teacher. In 1878 he got a job in Sfântu Gheorghe as a school sports teacher and in 1884 he was hired by the governing body of the Fencing Institution in Cluj by acclamation. He proved illustrious in this position, records say, due to his activity the number of students dispensed from sports decreased from year to year.

István Kuszkó, the secretary of the Athletic Club of Cluj, Albert's friend and competitor characterized the young sports teacher with the following words: he was a competitor, a leader, he wrote, he drew and organized trips. He devised mechanical and electronic inventions, he rode the bicycle, with other words he did everything for the cause. And when he saw that his example was being followed – he got married.<sup>5</sup> The young sports teacher soon had four children.

Beginning with 1872, in Cluj, sports was taught within the frameworks of the local Sports and Fencing Association. The Sports Fencing Center located in the center of Cluj (Mihai Viteazu square) was the common gym for all the schools, while the sports teacher was provided by the association. This could be the explanation for



**Károly Albert**

<sup>4</sup> Killyéni A., Biographical collection of the sports life of Cluj (1818-1918), Cluj, 2006

<sup>5</sup> 3<sup>rd</sup> Annual of the Athletic Club of Cluj, Cluj, 1890

Károly Albert teaching altogether 30 hours a week at the five high schools of Cluj (Catholic High School, Reformed High School, Unitarian High School, Higher Elementary School for Boys and Teacher Training School) as well as the Academy of Commerce in 1890. This number of hours was completed with the regular activity at the Fencing Association, thus Károly Albert was working 40 hours a week. In the following years his job became even more difficult: he worked with more than 2500 students from the 6 educational institutions in 40 hours per week.<sup>6</sup>

At the beginning of the 1890s it was obvious for the managing committee of education in Cluj, the schools and the Sports and Fencing Association that the question of physical education was not satisfactorily handled, that Károly Albert was way overburdened, which had to be solved as soon as possible. Besides, the sports teacher wasn't provided with sound finances, he wasn't entitled to pension or any other allowance in case of retirement, because he wasn't a budgetary employee. In case of his death his wife and children wouldn't receive any allowance from the state. Despite all these, those affected kept delaying the solution of the problem.

Unfortunately Károly Albert didn't live to see these changes. Because of the overburden, his heart weakened and his heart condition worsened at a great speed in one year. In 1895, the condition of the 37-year-old sports teacher became worse, and he died on 29<sup>th</sup> September, the same year. The sports teacher of the association was killed prematurely by hard work – recorded sports executive Károly Haller. He was an ambitious, striving young man, enjoying many people's honor and love towards him – said good-bye to him the principal of the Unitarian High School.<sup>7</sup>

A great role in revealing the cause of his death had the local media. Superhuman work accelerated the exhaustion of his body, and killed the outstanding young man prematurely. He had been fighting rheumatoid arthritis for years. The effort of preparing for the national Sports Festivity accelerated the catastrophe. The sports teachers attending last year's Sports Festivity were amazed that here so many institutions had only one sports teacher, while in schools in the west of the country sometimes two teachers shared the exhausting work.<sup>8</sup>

The Alberts became outlaws overnight, without any income. The oldest of the four children was 6 years old, the youngest 8 months old. They soon had to give up their sublet, and they couldn't count on anyone for financial help. At that moment Károly Albert's friends and colleagues started collecting money, hoping that they would be able to collect as much for each orphan that it would be enough for the family until the children turned 18. According to first calculations, almost Ft 3000 were needed. In two years the money were collected and Albert orphans were taken care.

After Albert's death the local schools called off the contract with the local sport club, they began to hire sport teachers and to build their own gyms.

<sup>6</sup> The Hungarian Youth's Physical Education, Opposition (Ellenzék), 1896. aug. 8.

<sup>7</sup> The 1895-96 Annual of the Unitarian Secondary School

<sup>8</sup> The 1895-1896 Annual of the Higher Elementary School

### Sport teachers in Cluj

**Gyula László** (Braşov, 1864 – Cluj, 1942)

Sports teacher, he finished high school in his hometown, later studied philology at universities from Budapest, Berlin, Tübingen and Halle and graduated in literature also getting a teacher's degree. His love for sports urged him to become a qualified school sports teacher and dedicate his life to sport. He started teaching at the László High School in Budapest, and beginning with 1894 he became sports teacher and fencing-master at the high school of Bratislava. From 1899 to his retirement he was sports teacher at the Unitarian High School of Cluj. He was the one who introduced the sports evenings, the end of school games (gymnastics, fencing and games) and the "ten-minute exercising" spread thanks to him, too. He organized competitions between schools; he was founding member and overseer of the gymnastics department of the Sports Association of the Commercial Clerks of Cluj. He held therapeutic gymnastic sessions at the hospital in Cluj. He retired in 1931, but he continued teaching in his school for two years. He is resting in the Házsongárdi cemetery. His son, László Tihamér was an outstanding physicist in Transylvania.<sup>9</sup>

**Sándor Varga** (Makó, 1877 – Cluj, 1926)

Sports teacher, he got a degree as a school sports teacher and fencing-master in 1900. From 1901 to his death he was sports teacher at the Reformed High School of Cluj. He was founding member and overseer of the gymnastics department of the Sports Association of the Commercial Clerks of Cluj. Varga discovered István Somodi, who later became silver Olympic medalist in high jump in London, 1908.<sup>10</sup>



**Sándor Varga**

**László Gerentsér** (Szeged, 1873 – Budapest, 1942)

Sports teacher, sporting specialist, athlete of the Hungarian Athletic Club, winner of several sprint races from 1896, record holder in the 440 yd race for several years (52,5 s). Besides athletics, he also practiced rowing and fencing. From 1904 he became teacher of modern sports and Italian fencing at the University of Kolozsvár. He was teaching in our town until 1907, he also got his doctor's degree then. At the invitation of the University Athletic Club of Budapest, he became

<sup>9</sup> Gyula László's Autobiography, Unitarian Archives, Cluj

<sup>10</sup> Killyéni A., Killyéni P., Sports History of the Reformed Theological High School of Cluj, Cluj, 2004

fencing-master and sports teacher of the association beginning with 1907, and from 1914 he was appointed sports head. He retired in 1923. His masterpiece, *Athletics* appeared in 1911, being one of the first modern writings on athletics. He also wrote the history of fencing.<sup>11</sup>

### Univesity Sports Life

In Cluj the university sport had also an important history. In 1875, ten years before the foundation of the local athletic club, Dr. Lajos Molnár, one of the most important sportswriter of that time, pointed out that the education of the youth was wrong, therefore it degenerated: it had a weak intellectuality, a graceless body, corrupt morals; only one tenth of the youth could be regarded as the pride of the nation. He accentuated that besides the university there was a need for sporting institutions which could promote students to consolidate their will power, physical skills and power. The need of primarily consolidating physical power, the feeling of this need led to exercising the body. He believed that there is no life without motion and motion is exercise.<sup>12</sup>



**Béla Göllner**

The University of Cluj was founded in 1872, and for almost 10 years it didn't provide the students the opportunity to practice sports. In autumn 1884, students urged the foundation of an athletic club. In 1885, the Athletic Club of Cluj (ACC) was founded and students joined the new association in great numbers (at its foundation, 75 students became members of the association).<sup>13</sup>

The association provided the financial background for renting a gym and hiring sports overseers. Moreover, it also provided regular trainings in winter, with the supervision of the overseers. The statutes of the association stated that trainings would be held every evening (except Sunday) between 7.30 and 8.30 according to the following program:

- ☐ Monday and Thursday fencing with swards, foil fencing and boxing
- ☐ Tuesday and Friday physical exercise
- ☐ Wednesday and Saturday athletics
- ☐ in summertime the association rented the Shooting Garden.<sup>14</sup>

<sup>11</sup> Killyéni A., *Biographical Collection of the Sports Life of Cluj (1818-1918)*, Cluj, 2006

<sup>12</sup> Molnár L., *Athletics*, Budapest, 1875

<sup>13</sup> 2<sup>nd</sup> Annual of the Athletic Club of Cluj, Cluj, 1888

<sup>14</sup> 1<sup>st</sup> Annual of the Athletic Club of Cluj, Cluj, 1886

The association kept track of the number of participants at trainings, records prove that the leaders of the association followed the trainings of club members. This is one of the explanations for several university students achieving outstanding results at national competitions, as well as for the improvement of results at certain trials. For example flat race: at the first competition Zoltán Velits won with 13 seconds, while some years later, in 1888 Simon Gáll won the same race with 11 seconds. Similar improvement could be traced in long jump: in 1889 Béla Göllner won with 619 cm, the second best national result of those times, which no one dared to compete with.

Beginning with 1891, the ACC disappeared from the list of athletic associations, marking the end of the first successful period of athletic life in Cluj. After some years of stagnation, at the beginning of the 1900s the athletic life revived thanks to Lajos Vermes, fencing-master at the university. Vermes realized that the decaying ACC was not suitable for university athletic life, and urged the foundation of a university sports club in Cluj, too, after the model of the University Athletic Club of Budapest. Therefore, in May 1901 he organized a university athletic competition. Although the number of competitors was quite small, after the competition the upholders of sport admitted that Vermes was right, and in 1902 the University Athletic Club of Cluj (UACC) was founded, becoming the third university sport club in Hungary and defining the sports life in Transylvania for a long time ahead. Later, dr. István Somodi, the association's outstanding competitor won Olympic silver in London.<sup>15</sup>

Unfortunately, Lajos Vermes couldn't bear the thought of having been removed from the board of the association, and at one of the UACC meetings together with his supporters, he tried to change the board by force, which alienated both sportsmen and sponsors from the association. After his gaffe, Lajos Vermes left Cluj and the new board of the UACC slowly lured the sportsmen back.<sup>16</sup> In 1906 István Somodi returned to the UACC, too; at this time he was already a famous high-jumper in Hungary. He achieved his best result at the Olympic Games in London, where he won second place in high-jump.

The citizens of Cluj were proud of Somodi's result at the Olympics. Roused by his success, the city council decided to have a sports site of European standards built, which would host both the athletic and football competitions. The sports site planned by Gyula Kovács was finished in autumn 1911; its inauguration on the banks of the Someş, at the end of the Central Park took place within the framework of athletic competitions.

<sup>15</sup> Killyéni A., Biographical Collection of the Sports Life of Cluj (1818-1918), Cluj, 2006

<sup>16</sup> Zuber F., The History of the Hungarian Athletics, Budapest, 1934-1936

## MOTIVATION AND PERFORMANCE

LUCIAN DAN CRISTIAN

**ABSTRACT.** We are trying to point out aspects regarding arbiter's mission, a very difficult one nowadays, when a fraction of second can make difference in great interests and passions. Alongside the physical and theoretic preparation, we have to take in account about psychological preparation. Optimal motivation means an optimal intensity of motivation able to permit higher performances. We also discuss about the interest, that for an arbiters means a career selective orientation.

**Keywords:** Motivation, performance, arbiter, aspiration

We, instructors and arbiters, in our mutually trying to limit as minimum as possible the arbiter errors during a game, we were searching for an answer to the question: "When and Why are we wrong?"

We already found out that, as the arbiter mission is a very difficult task, caused by the game increasing speed, by agglomeration of players in a very restricted areas, by pressing and aggressive marking, dealing with duels, or many contacts, by speed of execution in connection with the moment and place of fault committing, by sneakiness and players' protestation, and after all, a very short time (fraction of second) for a complex process of analysis and synthesis, involving extraction and procession of information, in order to take a decision.

We also found out that the factor "stress", is pushing more and more on the arbiter's shoulders, and could negatively give influence about his level of performance in a business world, of more and more great interests and passions.

We say that, alongside the physical and theoretic preparation, we have to take in account about psychological preparation. Most of mistakes do have as basis psychological causes, as decision making process during a game is a psychological process (perception with the four phases, dealing with attention and concentration all over the game, as well as an optimal placement), that function according to features and rules which could be positively or negatively influenced by different internal and external factors.

To achieve the highest performances, the arbiter must use of stimulation and activation factors, dealing with selective sense and persuasive, helping him to pass over difficulties in preparation, or stress factors, to resist on all external influences and promote him to the great performance. This group of factors having a role of stimulation and persuasive shall take the meaning of **MOTIVATION** (needs, aspirations, interests, persuasions, expectations, ideals).

Appreciating that terms like: aspirations, persuasions, expectations, ideals don't need for further explanations, we have discussed more upon the term of **INTEREST** and said that, for an arbiter, this means a selective career orientation, relatively stable and active to the specific activity of arbitrage.

In this regard, I propose on the start to settle out what are the needs, and consequently to make a link between motivation and performance.

Needs are basis motivational structures and fundamental structures of personality, and their best forces reflect the best the human psycho-social balance, in conditions of external environment solicitations. They put signals of re-balance requirements.

Several classifications of needs have been made therein. The most important one seems to be done by the American psychologist H. Maslow. He put in evidence 5 categories of needs organized in structured in a "*pyramid of needs*".

**Needs of self-attainment**  
**Needs of deference and statute**  
**Needs of membership**  
**Needs of security**  
**Biological Needs**

Un-satisfied need is the one that motivate behavior. A need doesn't occur as motivation, as the former need to it wasn't been satisfied, suggesting a chain existence, a succession in needs satisfaction. After the need previously satisfied, occurring of a new need doesn't have been done at once, but gradually. As a need is placed next to the top of the pyramid, the need is more particular to humanity. These needs, next to the top, are not so urgent, from a subjective point of view, but their satisfaction gives serenity, soul peace, and happiness. Helping with this pyramid we are able to better understand one individual behavior.

Normal satisfaction of needs leads to tensions reduction; un-satisfaction of needs leads to exacerbate of tensions.

**MOTIVATION** doesn't have to be considered and valuate as a scope itself, but merely put in the goal of highest performances. Performance is a superior level in achieving of one scope. We do stress is the value of motivation and propulsion efficiency. In this regard, problem of relationship between motivation and performance has a theoretical, as well as practice signification.

Relationship between motivation, as intensity, and level of performance, is dependent by activity complexity that the subject has to undertake. Psychological researches showed that, simple repetitive tasks, having an automate components, and few alternatives of solving; by increasing intensity of motivation, the level of performance increases as well. In complex tasks, as arbitrage, enriched in alternatives of solving (to stop the game, or to leave the advantage; to confer a direct or indirect free shooting; it was intention, or negligence, or imprudence; do I have to apply a

disciplinary measure, which one etc.), increasing the intensity of motivation is associated reaching a point to the performance grow, after that point performance stays or even decrease. It happens in this way because in complex tasks, several alternatives in action put in weight motivational impulse, and the intensity in growing of this motivation is un-favorable for discrimination, discernment, and valuations, appreciating. Efficiency depends mostly on relationship between intensity of motivation and difficulty of the task (a game) a individual (the arbiter) is dealing with. Efficiency shall be assured as well as between intensity of motivation and difficulty grade of the game does exist a bigger correspondence and complementarily.

In this regard, in psychology occurred the idea of OPTIMAL MOTIVATION, meaning an optimal intensity of motivation able to permit higher performances, or expected performances.

It does exist an optimal motivation in two hypotheses:

*a) when conducted game difficulty is correctly appreciated by the arbiter.*

In this case, optimal motivation means correspondence, even equivalence between the two notions. If the game difficulty is great, means there is need for a more intensive motivation for achieving; a medium intensive motivation is sufficient for conducting in good conditions etc.

*b) when conducted game difficulty is wrong perceived (appreciated) by the arbiter.*

In this case, there are two particular situations: the importance sub-valuation, or the game difficulty, and either a super-valuation. As result, the arbiter doesn't be capable to mobilize his energy and efforts for a good mission undertake. On one hand, he'll be sub-motivated, he could have an energy deficit, and finally take to a poor, or modest performance. On the other hand, the arbiter will be super-motivated, acting under energy surplus, that could disorganize him, even stress him, could expense energy resources, even before facing the game. When an arbiter treats easily or super-value the game importance, he will reach to the same result: failure, poor performance.

The optimal motivation is reached by action on the two variables in our discussion: the arbiters getting use to perceive as correct as possible on their mission difficulty, by paying attention to the game importance, by anticipation of eventual difficult events during the game or, by motivation intensity adjusting, (strong emotions of anxiety or fear inducing), increasing or decreasing, that leads to super-motivation.

In our activity, we don't have to be pleased by any kind of performance, but pleased by better performances, the highest ones, meaning not only a simple personality achievement, but also a self-overtaking of possibilities. The motivational stimulus, which is pushing onto progresses and seeable self-overtaking, is known as LEVEL OF ASPIRATION.

This level of aspiration has to be accorded on the arbiter's possibilities and skills. A 7 rank, shall be a high level of aspiration for an beginner arbiter, without experience, could be considered as acceptable for a middling arbiter, but a

deception for an elite arbiter. For middling arbiters, level of aspirations relatively low, it does express a success, while for those skilled, a regress.

They risks to regress to the extent of their capacities valuating, if they are pleased with this low level of aspiration. That's why is better to have a positive effect, as level of aspiration, a little up from the moment possibilities. We don't have to never forget that a too great difference between arbiter capacities and his aspirations is also dangerous. La Fontaine said in a fable that when a frog wants to inflate to reach as big as an elephant, that frog ends in blow out.

For performance achieving, your motivation has to express objectivity in decisions taking. Objectivity that means for neutrality, impartiality, and equity. This is to be honest, non-labile to influence, to be brave, detached, and lucid on the game place.

Only competence (knowledge, and a good preparation, communication skills, flexibility in relationship with others, understanding of role and expected requirements), alongside the objectivity, could warranty for performance, credibility and respect.

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## STRESS AND PERFORMANCE

LUCIAN DAN CRISTIAN, PRODEA COSMIN<sup>1</sup>

**ABSTRACT.** Stress detect and control is an issue psychology deal with. In the same time, this issue can apply in sport activities, in order to achieve a best performance. In this material we could make a response to questions like: Why different persons act to the stress in different ways? Fear of lose, or fear of victory? How can we fight against stress? And finally, some advises about stress control.

**KEYWORDS:** stress, performance, anxiety,

Saying about performance in sport activities, we all are thinking only to physical and theoretical preparation. We maybe forget sometimes that one of the main factors leading a performance is psychological preparation. In that follows, we are trying an approach of several terms in this regard.

Concept of stress

Different persons interpretation the term of “stress” in different ways

Psychology or Physiology leading?

Nevertheless, there are clear signs of psycho-emotional lack.

### PRESSURE

It can be the pressure measured objectively? Definitely no. Two players shall never act the same manner in simultaneous situations, proving therefore that relationship between subject and case is the most important factor, and the fact there is a lot of work on this “relation”.

### POSITIVE AND NEGATIVE STRESS

The authors distinguish between positive stress (catecolamin, adrenalin), which is necessary in preparing the individual for an activity, and negative stress (cortissol), which is responsible for “staying on the place”.

In order to point out emotional status of one individual, blood analysis could be taken when the individual wakes up in the morning.

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<sup>1</sup> University of Babes-Bolyai from Cluj-Napoca

### **FEAR OF PUBLIC REACTION (FRIGHT)**

We often hear about so called “stage fright” the actors are facing with before a role start. No doubts, this kind of fright is necessary for put them capable to offer all the best during their representation. This affects even the skilled actors.

This happen also with the players:

- anxiety that appears before the game is a positive thing, as time as it remains on an acceptable level;
- to the skilled players, this anxiety disappears step-by-step after the game start.

### **SYMPTOMS OF STRESS**

Symptoms of stress could be many. We enumerate as follows a few examples of symptoms, appearing to the persons suffering of a high level of stress:

*Physiologically:*

- up level pulse
- high breathe rhythm
- muscle tension
- high blood pressure
- dilated eye pupils
- low level of coordination
- low spirit of observation

*Psychologically*

- agitation
- anxiety
- frustration
- low level of concentration
- advanced fatigue status
- boringness
- aggressively
- state of nerves

Defensive Reactions:

- repulsion
- negativism
- introverting
- aggressiveness
- desire of escape
- isolation
- rationalization
- intellectualization
- regress

### **HOW TO REDUCE ANXIETY**

There are some simple methods to reduce anxiety:

- controlled breathing practicing
- knowing of the anxiety physical effects
- trying to relax the muscles under the tension
- concentration of what is have to be done
- to express a self positive imagine
- fear into emotion transforming
- anxiety into energy transforming

### **FEAR OF LOSE... OR FEAR OF VICTORY**

Human do fear of what?

Fear of victory, although seemed to be a paradox for non-knowledged, does appear for very many times. Cases of lose after the victory was imminent are notorious.

To enter from an emotional status of loser person, have to be avoided at any price!

Few examples:

- a player playing well, but telling himself that thing cannot be durable. Fatal error is unavoidable, as he expected for occurring.
- A phrase like “I knew that it won’t work!”. This in another example of a person anticipating the failure.

Focusing exclusively on what is have to be done, by ignoring the success or failure consequences, still remains the best solution. Moreover, it is important for us to learn to accept, and to have the power to pass over the failures.

### **PROTOCOLS**

All protocols before a football game have to be respected.

Studies show that European people have many individual rituals, while African people prefer rituals in a group.

Different kind of superstitions appears to the players, and their importance for each of them is a meaning.

### **NEGATIVE EFFECTS OF STRESS**

All negative effects can be occur in different ways:

- a poor start of the game, which have impact on the rest of the game;
- a stressing situation, especially after a lose: failure in a situation “face to face” with the goal keeper, a decisive penalty shooting failing (last minutes of the game, or shooting of victory).

These effects occur also in other particular circumstances:

- in period of time prior to a decisive game (eliminary game, or final of championship);
- incapacity to resist on the important game series rigors.

### **HOW IT CAN FIGHT AGAINST STRESS**

#### *Problem no.1: How does situation have been perceived?*

A child playing in a game under inter-school championship, together with his friends can experiment very high levels of stress, because his chances to be selected again are dependent by his play (or in his opinion).

#### Solutions:

Perceive of situation changing: put the real importance of this situation as a perspective and focus on the joy of playing and to the fact that players could make mistakes.

The key is to give always the best and to focus toward the game, despite of its stake.

#### *Problem no.2: Importance of entourage (environment).*

A young player can collapse in one game as result of enormous pressure from his parents, or when his trainer criticizes him for every mistake.

A fear gives birth to another fear, and a stress gives birth to another stress.

Players of any levels need for an environment (like trainer, or mentor) to assure them control and discipline.

Unfortunately, this thing does not happen, and efforts have to be done in this manner.

#### Solutions:

Entourage control (parents, trainer), asking them to control and to think on effects of their behavior upon the subject.

Sometimes, have to make abstraction of entourage or, even better, a additional motivation to the negative situations (this think claims for experience).

#### *Problem no.3: Decisive Actions*

Thinking over the consequences of a penalty failed, a player is focusing upon the consequences of his action, despite of thinking on the action itself; any player who catch in this “vicious circle” have to suffer.

#### Solutions:

- to focus exclusively on the main task;
- to try eliminate all surrounding matters;

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- to free the mind;
- to take away negative thoughts;
- to desire success.

### *Problem no.4: Fear to not play in a game*

Players, sometimes, especially the youngest, sense the need of tension liberation, fearing more or less to enter in a game, despite the fact of their good preparation.

#### Solutions:

By working harder on trainings, having any results, players don't need to think over only to self-critics; if they are good prepared, they will face the situation, and the level of stress should be low.

Reciprocal is also valid, the stress occurring many times in the context of lack of preparation (e.g. We are fear to face an exam knowing we don't prepared sufficiently).

Players don't have to focus on their role in a team.

### *Problem no.5: Role of anxiety*

Thinking that the anxiety always inhibits is a mistake.

People have fear of previous failures, but they don't want to face the same frustration again.

As time as the anxiety doesn't pass a level, could be a motivating factor, inspiring for caution, and a desire to avoid the failure.

Particular pressing of a situation (e.g. fans attitude after a lose) gives a greater effort from a player.

On the contrary, a very quiet atmosphere, a calm environment doesn't create the anxiety as needed.

From this point, we can conclude that "fear, terror under control" makes the players to evolve better. Prior game emotional status is relatively normal, not saying recommended, permits to a player to know his level of stress and concentration.

We all know that, as the game start, stress disappears in most cases (except stresses treatable). It does exist some players not showing too advanced emotive.

Natural self-trust, in a native manner and not under simulation, represents a sign about this individual has a great confidence in what he could attain. It is normal to us to expect on performance from him.

#### Solutions:

The trainer who is motivate his players, adopting an attitude that stimulate, positive, full of energy himself plays a very important role in emotional status control before the game. Particularly, body language is important.

Nevertheless, as the soul status (internal) is reflected by external actions, adopting of a positive attitude and concentration (external) has a great influence on the soul status (internal).

There is a greater influence the way in which trainer sees the game, as well as preparation for it, as the players actually imagine and also toward their emotional status.

It is very important to do a distinction between anxiety, as component of character, and anxiety as a spirit status. On the second case, when players are suffering of "temporary" anxiety, is easily to be treated, even tough, as general rule, is worth to learn how to control stress situations.

### **STRESS CONTROL**

There are some known measures used in the world of sport, each of them addressed to one issue.

How to approach?

There are some examples:

#### *Situation Changing*

The measure consists a control of situation aspects, which are causing and leading to anxiety. For instance, for decreasing of incertitude, it is better for player to know whether he is titular or reserve player in an optimal moment.

#### *Control Methods of Somatic Stress*

These so called methods of "physical meditation" could bring either a active status, or a passive status of relaxing.

For minimize internal tension or for improvement of capacity of self-control, biofeedback could be adequate (equipment by which amplifying and detection of electric-mio-graph changes are permitted, causing muscle tensions changing, or skin temperature growing, as the status of muscles' relaxation).

Interesting on the biofeedback is the fact of is capable to control the optimal level of implication in activity.

#### *Control methods of Cognitive Stress*

This method is based on negative thoughts reducing ore eliminate, the causes of a stress.

#### *Mental Training*

Principle is: as the entourage of one player can be changed partially, it is trying in changing the way of perceive of entourage. Mental preparation represents a symbolic repetition of physical activities themselves (the skiers mentally see their descending before the course).

Representation of these images has positive effects, particularly when done the same time with physical works.

*Freedom from an upper affective status*

Players are well advised to try to relief from high affective status, in order to have a good game.

Experience shows us that this thing is not achieved always.

Many players admit that they were pushed by stress all over their career, before, and even during games.

When to desire of victory was attached a excessive level of stress, usually, performance has to suffer.

Emotional detaching (capacity to control stress level and to relax) does permit to the player to discover necessary far-sightedness during game.

To an individual to another, this thing could be useful in the day of the game, or even during the game.

Introducing in trainings, or games for preparation of factors by which a real game conditions can be imitated, develops their self-control, useful in real game.

Thus, the anxiety prior the game becomes a positive factor, able to improve acting level during the game.

Self-knowledge permits to the players to discover the best effective way in assuring optimal conditions for a game playing.

Representation of these clear images has positive effects, mostly when done in the same time with physical exercises.

**CONCLUSIONS**

First of all, the key-role of entourage has to put in evidence:

- Trainer
- Parents (for the younger)

**Play to your maximum potential**

- Only in this way you can achieve the best results.

**Be self-learning**

- Understand to yourself
- Try to identify your emotions, and to recognize them, and to understand the way of occurring, and try to manage them
- Find a personal policy (control, active relax)

**Prepare as good as you can**

- To be good prepared is an inspiration for self-trust.

**Focus on your own work, not the others**

- Desire to you to continuously develop
- Play with passion

- Enjoy your game
- Avoid playing under pressure
- Don't become a results slave
- Accept all failures (unavoidable parts in learning process)

A good player is the one who develop himself, who enrich when plays football, who knows to give all the best from him all the time, and who understands that, no matter of result, it is only a temporary indicator about his success or failure.

In each case, it is necessary for you to take in account all psychological factors, particularly the stress. That is why, personality tests and motivation have been elaborated for football players, analyzing also their resistance to stress. These tests helped us enormous in solving similar problems treated by this article.

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## THE SPORT-COMMUNICATION STRATEGY OF THE UNIVERSITY OF DEBRECEN

NAGY ÁGOSTON<sup>1</sup>

**ABSTRACT.** The Operational Sport Programme is the most important element of the programme of the University of Debrecen intending to mend the quality of life. The execution and success of our targets in changing people's approach depends especially on the fact how we can involve professionals concerned in all fields of sports and PE, students, sport organizations, the business sphere, sport- and other kinds of institutions and also other people, and to make them co-operative and let them share interest in execution. That is why the communication of our plans and the passing of messages towards people concerned has such a significant rule. The programme is non-current, so it also requires such way of thinking while shaping up our sport-communication strategy. It is also very important for us to lay down the matter of the message of our sport strategy and to choose the right technique to bring the concrete strategy of communication into effect.

**KEYWORDS:** sport-communication, sport strategy, communication areas, sport-communication tools, human resource, life quality

### **The most important strategic messages of the sport- communication of the University of Debrecen**

- Regular physical training (minimum twice 30-30 minutes/ week) is the best method to keep the body healthy
- The ethical property and characteristics of sports make them the best device for representing education and sport is the most efficient tool for it as well. Our outstanding sportsmen serve as both examples and ideals and we should lead the attention of people to them. They can become real idols.
- Sports evolve good community cohesion. The sport community is able to reform the everyday life and the quality of it in a positive way.
- Lifelong learning, doing physical activities and getting to know culture ( Sport- Education – Culture) is our main goal, and that is what we find most important with respect to personal developments.
- The strategy has the idea of a “Sporting Nation”, which includes keeping our title and place as a “Sporting Nation” and the protection of these values. The state of healthcare of the country urges sweeping changes in the

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<sup>1</sup> Sports Directorate of the University of Debrecen; E-mail: [si@deac.unideb.hu](mailto:si@deac.unideb.hu)

attitude towards sports and implies motivation for doing so both systematically and pragmatically speaking. The Sporting University is the leading slogan of this change.

- Sport is a crucial part of culture. It cannot be separated from human sciences; it has to connect closely to education and the knowledge of culture.
- We have to integrate our knowledge into all branches of sports, namely: technical developments, the results of sport science, the acquisitions and researches of sports medicine and the knowledge of sport management.
- Sports serve as vital devices for inspiring free time economics, spare time sport economics and its processes.
- Only the legally and cleanly gained success in sports counts as real value! Being successful in sports as an aim, do not sanctify the use of any forbidden materials.

The mediation of the above mentioned values is our constant task. With forming and balancing the opinions and messages of our strategic partners in University Sports (teachers, coaches, student governments, sport therapist, trainers, tutors and people dealing with sport media) have to come to an end that goes hand in hand with what we already started in the media. In the view of sports and physical education at the University we need crucial changes. Due to this, we created a coherent theoretical background.

### **The communication strategy is built up of two main parts, described by two main tasks**

a.) To pass the basic theories, messages and plans of the Sport Operative Programme to the target group.

b.) The fulfillment of the Sport Operative Programme with the help of original communication projects and campaigns.

During the communication we defined practical ideas aimed at pupils, students and teachers. These creative campaigns reflect social expectations and demands by facilitating the communication on different levels. It is essential that communication takes in the University of Debrecen and the whole region around it. As a consequence the regional sport councils, county sport directors and the small-regional deputies also need to take part in spreading the information about the change of lifestyle and attitude. <http://www.sportolonemzet.hu/php/keret.php?m=2&sm=81> (20.01.2008.)

### **The communication areas included in the programme**

One of the basic elements of the competitiveness of the University is to show from a new angle the everyday life of the University students, their ways, possibilities of entertainment and their values. Within this context the University of Debrecen advanced the following communication programmes:

- ⇒ **An Open Day** in the fall semester
  - Has great importance, since pre- University students are able to meet present students and gain some insight into all the areas of University
- ⇒ **Application into sports programme**
  - Aims to improve the image of the University. This programme introduces by first hand the sport life of the University, the sport centers, championships, the popular branches of sports, the sporting scholarship system and sport ideals to high school students.
- ⇒ **Sport Almanac**
  - Mediates the quality of the University sports. SPORT-EDUCATION- CULTURE. It introduces several sport fields, but you can also read about the most outstanding sport events of the last few years.
- ⇒ **Sport results**
  - Publicity has news value in most cases. It is clearly shown that in the new generation and the professional sportsmen of the University we tend to make the results and programmes of the DEAC more accessible.
- ⇒ The Introduction of the **stars of the University**
  - Those students who are known by the locals, by the nation and in rare cases by the whole world, since they make the University more popular with their activities.
- ⇒ **The communication of free time activities**
  - This is the most regular task. It can move the biggest crowd. Due to this, it is important to give attainable information of our services.
- ⇒ **The requirements of physical education**
  - Its fulfillment dynamically follows the claims, our renewing possibilities and preparedness. The Sport Operative Programme is affected by the means which influence gaining the popularity of sports, serving as the basis for physical activities.
- ⇒ **The winning of successful scholarships**
  - Besides helping the organization and operation of quality sport events, it also leads to the future, since gaining a more global support for continental championships invoke successful tenders and better preparations of background information.

⇒ **The regular and occasional competitions**

- Make life more vivid. The notification of dates, places, participants and aims is a vital communication element for our hectic University to make these events more attractive.

⇒ **The sport facilities programme**

- Mainly concentrates on the well working of the sport fields and sport halls. The happenings here have an influence on the citizens. Besides initiating the above mentioned, we also need to emphasize the capacity for hosting more sport events to avoid the negligence of these places.

⇒ **The developments of sport facilities**

- Is crucial since during the last decades the number of students increased and their demands changed as well.

⇒ **The University sport marketing**

- Influences remarkably the standard of free time sports and championships working at the University of Debrecen. The potential profit cannot be neglected if we think of the 35000 citizens of the University.

**The sport- communication plan and the attainable resorts**

- Modern techniques and the Internet provide possibility for sending multitudinous text messages.
- The weekly sport newsletter enlightens everyone about the present achievements, programmes and possibilities.
  - The electronic newsletter is the fastest way to share information about our work with the media. The recipients live with the given chances which counts as news value to them and with respect to this they publish it.
- For the people of the University we refresh the sport homepage every day. The more significant articles are published in the University paper at the four-page sport section, entitled ELÁN.
- ELÁN is published twice every six month, which is aimed at everyone.
- The University has extensive activities. Web pages appear in different topics. In the menus of these you can find sport too.
- The means of direct marketing are circulating brochures and posters advertising programmes, events and contests. It is mainly centered on campus, but there are other information points arranged logically in town.
- Billboards work systematically. The advertisements are liable for license and they are decorative.
- With the help of students' council we can reach those students who do not think about sports, so not to miss programmes shaped for them.

- Formal letters serve as a major communication tool for reaching those without whom it would be impossible to materialize the Sport Operative Programme
  - We ordered a regular magazine and broadcasting (ELÁN) at the local TV channel. Our media contributor plays a crucial part in editing these programmes.
  - His job is to edit the present and occasional materials of the teletext.
- We can hear “University Sport times” on the radio
- In connection with great sport events we hold press conferences, where you can personally meet the representatives of media.

### **Free time sports and the media**

It is a common fact that Hungary lags behind with respect to free time sports, and the number of people taking part in sports compared to other EU countries. To fix the situation, we have to improve the demand- supply system of spare time sports. The best method of strengthening the demand side is by changing the attitude based on persistent communication. It can be obtained in practice by a conscious and well planned marketing, which helps to inspire the nation for doing sports. During the communication process we have to mediate the following messages:

- Sports are highly important, it helps to keep healthy, and hence we have to make people aware of the advantages of sports and this way of life.
- Doing sports makes you feel better and it also increases your working abilities and helps to keep it on a higher level.
- Sports are entertaining. They give you success, self-confidence and also help to integrate into the community as well as creating public spirit, the feeling of belonging together and they also improve the self-identity.

Just like in the appearance of racing sports on TV, in the communication inciting leisure sports we also need to focus on media portfolios. First we have to decide and separate the social group, which is the target of our ads. Obviously the message is different in case of high school and University students, or pensioners. The latter can be approached in the old-fashioned way, by letter or more conservative programmes and TV channels, dailies emphasizing the preservation of health, good feeling and to keep up hard-working. While younger generations can be reached via new technology like Internet, lifestyle magazines, music channels mainly referring to their integration into society, building up their self confidence flavored by humour.

After defining the target group it is logical to evolve a partnership that covers the whole media business group, which represents a binary commitment. We have to make agreements with a TV channel, lifestyle-magazines, dailies and magazines, Internet suppliers, other companies owning public surfaces, a radio and other organizations representing media. Exclusiveness is advised and it is also advisable to handle the contest sports related media areas in the same manner as media conferences.

After the media-portfolios are set-up, we have to start a campaign centered around University sports, spare time and other sports at least twice every two year. The campaign should operate with the help of a variety of society aimed ads, and discount media area purchase (see under media portfolio). It is needed for the advertisement of the sponsors and proponents dealing with it. It is essential to complement the campaign with conferences, free time sport events, press-conferences and other gatherings for the private sphere. To this work we also have to involve the public health experts, teachers, coaches and famous people, the so called opinion- leaders. The communication programme shall not only be about the promotion of sports, but like in all campaigns it has to have a concrete, practical message, that defines the name and topic of the programme. Such thing can be the finishing of the improvement of facilities, the introduction of sport cards or the cover of pedometers and training-diaries. These elaborate programmes have to appear in the one-year plan of the University dealing with sports. Communication areas serve as tools for the mediation of sports, ideas about them and the inspiration for them.

The questionnaire that was announced in Hajdú- Bihar county among media representatives was answered in a great variety. In the shaping of sport-communication strategies the following answers serve the basis.

*1<sup>st</sup> chart.*

**The answers given to the questionnaire by the HMB media representatives**

Do you have any sport programme or bulletin?	100% answered yes
Is University sport news-value to you?	83,33% answered yes
How many times a week do you deal with University sports?	60% said once
How satisfied are you with the popularity of your sport section?	42,86% are moderately satisfied
Are you willing to enlarge your section dealing with sports?	71,43% answered yes
Do you need regular information about University sports?	84,62% answered yes
Do you need regular information about the results of the University sport events?	84,62% answered yes
Does University sport have an outstanding role in your sport bulletin?	30,77% said yes
What marketing value has the University sports at your company?	23,08% fairly valuable
Do you see any connection between the quality of University sports and your marketing about it?	30,77% considers the connection adequate

## **Communication Aims**

### **1. Community Campaigns**

Community campaigns can effectively mobilize students, regardless of ethnicity and social status. According to international experience, effective community campaign can raise the number of those doing physical activities by 5%.

These campaigns have to endeavor to reach wider scale of nation, to have good visibility and to employ a huge variety of media areas, like local TV, radio station, local papers, cinema, posters and other tools of direct marketing.

### **2. Messages aiming to motivate the doing of sports**

Such can be for example signs placed near elevators and escalators, to inspire people to walk the stairs instead of the lift, emphasizing the possibility of losing weight and creating a healthier lifestyle. Based on international research, signs can increase the users of stairs by 54% regardless of where we are. As a consequence their usage is advised at subway stops, in shopping malls, in educational and public institutions and in libraries.

### **3. Proper physical activities and their effects**

It was long put into words by the medical society that Universities should improve the students' knowledge of health culture within a framework of health courses. It would give proper information about correct physical activities and their effects. The teaching of the above mentioned and the teaching of the prepared recommendation of these for medical students. Classes or facilities should be opened where people (especially older generations) can gain information about sports with respect to their age, sex or even their disabilities or disease.

### **4. University Campaigns**

These campaigns have to endeavor to reach wider scale of nation, to have good visibility and to employ a huge variety of media areas, like local TV, radio station, local papers, cinema, posters and other tools of direct marketing.

Sportközlöny 2007.okt. 15.,

[www.kozlonykiado.hu/kozlonyok/Kozlonyok/24/PDF/2007/6.pdf](http://www.kozlonykiado.hu/kozlonyok/Kozlonyok/24/PDF/2007/6.pdf) (2008. január 20)

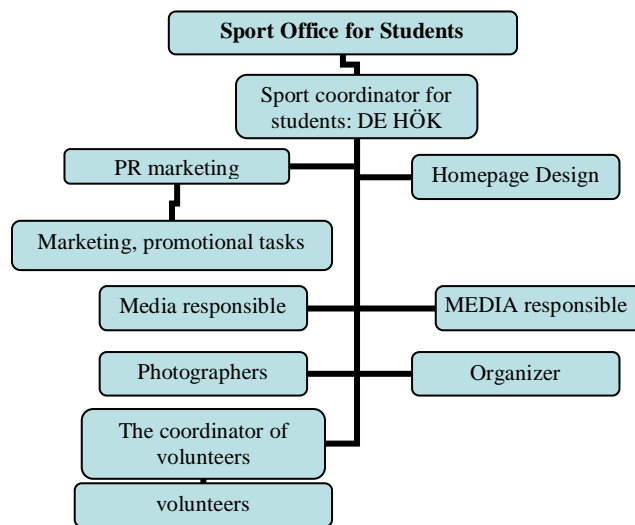
**The Sport-communication target groups**

Primer <b>TARGET GROUPS</b> of the sport-communication strategy of the University of Debrecen	Number of participants
For whom physical activity is compulsory	Approx. 7000
All the students	Approx.29000
Teachers	Approx.1500
Workers	Approx.5000
DEAC sportsmen's number	350
DEAC juniors	110
Citizens of Debrecen during school time	Approx.240000
All the students in Debrecen	Approx.60000
Sport unions	Approx.25
Citizens living at housing estates around the University	25000
Number of primer sport branches in Debrecen	Approx. 20
Number of registered sportsman in Debrecen	Approx. 3300
Number of registered sportsman in the county	Approx. 2500
Number of students relieved of physical activities in 2007	120

**Human resources in the communication of the University**

Sport- communication strategies concentrate on professional task completing. In the operative system of the sport programme the sport directory works hand in hand with the students' council. The volunteers of the Student Sport Office take care of the communication duties. This student job also helps their integration into society later on, since they learn the properties of a modern area and its relation system during their everyday work. The student sport coordinator collects those students who are able to properly and resolutely work on each field. Those volunteers who work at sport fields, help the influx of information, as well as those who take part in the organization and arrangement of prime events. Basically there are assistants and those, who are in charge, and responsible for them. The number of people taking part in the relation system is over 30.

*1<sup>st</sup> figure*  
**The Sport Communication relation system of the University of Debrecen**



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## THE BASIC CONCEPT OF THE SPORTS PROGRAMME OF THE UNIVERSITY OF DEBRECEN

NAGY ÁGOSTON<sup>1</sup>

**ABSTRACT.** In the past few years we got an opportunity to introduce a new, up-to-date programme, which resulted change in approach and solved the problem of competitive sports in the cases of many sports. It might be an advantage for universities rivaling for students, if the institute –next to giving students the authority of knowledge- prepares them for a healthy way of life and contributes to archive a sterling life.

For the sake of the cause, the University of Debrecen constituted years 2006 and 2007 the Years of Sports, decided to stand up for sports improvements and treat them appropriately.

Presently, there are more than thirty thousand students who study in higher education Debrecen has to offer, attending various forms of qualification training. Due to this fact, the majority of young adult population is trying to find their place in society as graduates, intellectuals. The revealing procedures of the last few decades' social- and regular conduct transformation and the medical statically evaluations show a negative outcome. The performance of future society -so thus the population of Debrecen's as well- is highly dependent on the carrying capacity, the health, the evolving lifestyle and the physical activity needs of today's generation. It is an extremely important task for the educational system to enforce the status of PE and sports, and to form and support student's needs for physical education. For certain age-groups, it is almost equivalent with the transfer of material knowledge.

Masses appeared in higher education to call our attention to the fact, that – as opposed to former conditions- we do have the opportunity to move huge masses and change student's approach. All this in such an age-group, which is about to enter adulthood, but is still in protected conditions. Has already an independent will and needs, and is on its way to show off from very tight bonds of family. This age-group lives in such a long-drawn-out period, when students are trying to set up for themselves, and are shaping up their subsequent customs.

There is an opportunity to introduce a new, up-to-date programme, which results change in approach, and means a solution for the problems occurring in the fields of competitive sports.

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<sup>1</sup> Sports Directory of the University of Debrecen, E-mail: [si@deac.unideb.hu](mailto:si@deac.unideb.hu)

Our ambition is that sports at the university –done among worthy conditions- prepare students for a healthy way of life in the future and to promote them to live a more complete life.

**Targets laid down in this programme:**

- To develop student's sports activities dynamically and to offer them more competition and leisure time sports-opportunity

The reason for this is that the number of students at the institution has increased by leaps and bounds. Over the usual amount of sports opportunities, the supply of sports has to stand all modern demands. The programme is also constantly impressed by the culture and needs of the university's international students.

We have to be aware of student's time-table for the most effective capacity.

- Necessary infrastructure should be improved and be reformed to suit up-to-date requirements;

***Insistent operational tasks laid down in the programme for hitting our target:***

- To resolve and develop the management and the operation of the institution. To make an effort on the economical utilization of the institutions belonging to the university or to the city by common compromise. The common tasks of the city and the university are prevention, rehabilitation, sport supply-training, and competitive sports.

It is essential for bringing our targets into effect that we think in a uniform system. That is why it is so important to define a concept -which we have developed together- about future tasks. We have to help host clubs to continue to exist by guaranteeing the basic conditions they need.

- Enlargement of the institutions together with the city of Debrecen

The big international competitions held all have a message towards people and popular sport competitions are visited by many of them. By developing outworn establishments we can win the right to host international and national championships as well. And last but not least, the conditions of the trainings can be better and more successful.

- To develop emphasized competitive sports and to support competitive sports at the university as well

Undertaking of many sporting events mainly depends on our funds and financial opportunities. Sometimes it is a question of the institution's background, and sometimes the question of objective elements. In some cases the university itself is able to feature sporting events. Moreover, it actuates and organizes sport supplies in many sports, although it needs the support of the city for that as well.

- To have the support of the city to recompense for prominent performance in sports and to support the fellowship at the university

Several students of the university compete at sports clubs in Debrecen.

It is a stabile help for sections, that the new system of sports fellowship appreciates qualitative sports activities and sportsmen's work towards the university. Through the university's fellowship-system, the city government and the business sphere also has the possibility to reward sportsmen's performance. To effectuate this there is a need to operate a public benefit foundation.

- To enhance the organized co-operation with national and international sports organizations (MEFS, FISU, MOB, NOB), to have commonly organized national contentions and world tournaments with them

When appraising those who compete for holding competitions, it is point of vantage if the computer undertakes roles more often. We have to complete each other's imperfections and to boost our virtues. This way the settlements of the Youth Olympic Games for example may become a serious notion.

- To arrange and support international competitions for undergraduates.

The importance of sports at universities on a national level can be raised, when the competitions are held in a worthy place. That is why the university counts on Debrecen to lend them the sports-courts of the city. To fulfill this, there needs to be a written contract.

- To reinforce sports hygiene: to use the achievements of sports doctors' researches, to mend the standards of the city's sports doctors' services, to offer more free-time and recreation sports programmes in order to improve city residents' way of life.

The well-prepared, up-to-date professional work needs the results of sports doctors. Their research-conclusions can be used and are appreciated in all fields of sports, that is why there is a need for permanent contact with medical institutions. The university also contributes to execute sports programmes and bring a healthier way of life into affection by its medical and organizational capacity.

- Common organizations of sports programmes between the university and the city by the support of the city government should be held, which is subservient for the university to bring over more high-school students willing to study at the University of Debrecen.

It is a common interest that high-school students effect their purpose by studying at the University of Debrecen. Our sports programme has a basic rule in it as well. The university becomes better known by organizing talent spotter camps, transparent sport days, championships, conferences and balls. It shows a wide offer for would-be students.

- Allowances and bonuses for sportsmen. Students competing at one of the main sport clubs of the city receive special allowances and bonuses. The university appreciates performance in sport. There is an opportunity to award them with honors, to have their studies financed by the state, to give them fellowship, to let them study by a private schedule, or to offer them accommodation at one of the dormitories.

- Active involvement in organizing mass- and competitive sports events in the city. By agreement, using the university's establishments.

One form of collaboration is that we offer work for the university students, such as interpreting, translating, team-leading, and many several other tasks by

which they become more experienced and they make more contact. They can make use of this during their undergraduate years and even later on through their life.

- The University of Debrecen takes an active part in training qualitative sport professionals, taking the city's needs into consideration as well.

The senate of the university has accepted the plans of the sport programme. We are setting up extension courses, accredited courses, and OKJ (National Qualification Account) courses of trainings. Our primary task is to start an academic sport training of high standard at the University of Debrecen.

### **Summary**

The sports programme of the University of Debrecen has taken on complex tasks. It offers a new opportunity for its participants to co-operate and build up real values. The project has aimed at such areas –like integrating new programmes, calling attention to a sporty lifestyle and by cultural and educational services-which were declining in the past few decades. One reason for this is that the world had been broaden out and nowadays sports, education and culture does not mean such values and challenges as they used to in the past.

The task of professional specialists of sports is to think forward, and not just appoint today's problems but join with and make sports important and find pleasure in it again. This is the message of the sports programme of the University of Debrecen.

The 3 main buildings of the university need renovation and improvements in various levels. PE and free-time sports need improvements on a basic level, while competitive sports, education and emphasized programmes need to be improved on a higher level.

-the improvement of competitive sports should work by the co-operation of the university and the city of Debrecen

The Athlete Club of the University (DEAC) plays a significant role in the sport life of the city. It is the host club of many supply of sportsmen. It is a sports club where young adult competitors can succeed. There are special kinds of sports whose future supply is given by the DEAC. Thus in the fields of sports our university supports the work of the city government.

-the university and the city should push an advantage in competitive sports and the PR resided in them should be used versatile and all-round

The university and the city have reached spectacular success in competitive sports. Many international and national events are held here, which is an example to be followed. The street-running World Championships, the U23 European Championships and the European Short Course Swimming Championships ment the start, and now we have the possibility to compete for the organization works of the Junieur Olympic Games in 2010. In this case we also have to build in our programme and to emphasize the importance of cultural values and education.

#### THE BASIC CONCEPT OF THE SPORTS PROGRAMME OF THE UNIVERSITY OF DEBRECEN

-the way of life of university students (and city residents' as well) should become healthier and their attachment to the institution and to the city should become stronger

Debrecen is often mentioned as the capital of sports in Hungary, because its continental and international programs and their successions raised the city to the spotlight.

The university not just gives the possibility for students being brave at knowledge and sports to become a sportsmen, but also calls attention for regular sport activities. In addition, it shows students the traditional and also the modern opportunities for sports, which is unconnected with the cultural needs of this group of age.

## PLYOMETRIC TRAINING IN JUDO – EFFECTS ON HIGH AMPLITUDE THROWING TECHNIQUES

POP IOAN NELU<sup>1</sup>, VODĂ ȘTEFAN<sup>1</sup>, CRĂCIUN MARIUS<sup>2</sup>, PRODEA COSMIN<sup>2</sup>, VĂIDĂHĂZAN REMUS

**ABSTRACT.** The aim of this study was to verify the effectiveness of plyometric training in relation to the development of high amplitude throwing techniques in judo. The subjects were 22 judoka, aged between 14 and 26 years, with national level of performance for all weight categories. The results obtained proved that plyometric training is really efficient for the optimization of amplitude throwing techniques in judo.

**KEYWORDS:** judo, plyometric training, throwing techniques, tests, muscular power.

**REZUMAT.** Antrenamentul pliometric în judo – efecte asupra tehnicilor de aruncare cu amplitudine mare. Scopul acestui studiu a fost acela de a verifica eficiența antrenamentului pliometric în cazul dezvoltării tehnicilor de aruncare cu amplitudine mare din judo. Subiecții experimentului au fost 22 judoka cu vârste cuprinse între 14 și 26 de ani, cu performanțe de nivel național. Rezultatele obținute au demonstrat că antrenamentul pliometric este cu adevărat eficient în optimizarea tehnicilor de aruncare cu amplitudine mare din judo.

**CUVINTE CHEIE:** judo, antrenament pliometric, tehnici de aruncare, teste, putere musculară.

The contemporary Judo is in a continuous transformation, so that means developing and adapting training to new conditions is not optional but becomes mandatory, especially if you suggest peak performance. In this context, very dynamic, in terms of regulation, training and relationships that exist between sports performance factors, enrichment field with a new vision and new means of training can only be beneficial, both to sport in general and athletes in particular.

The initial idea of the experiment aimed at verifying the effectiveness of plyometric training in relation to the development of high amplitude throwing techniques.

From a strictly physical point of view an increase of power (mechanical work/time) will produce an "explosion" in any type of movement.

This is the purpose of plyometric exercises, making a movement in an explosive way during a stretching - shortening cycle of muscle contraction. Once this technique is learned and applied correctly in training, the effects obtained enable the athlete to develop in a shorter period of time a bigger force, and so will result in superior amplitude in execution of movements.

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<sup>1</sup> Cluj-Napoca, „Babeș-Bolyai” University, Faculty of Physical Education and Sport

<sup>2</sup> Cluj-Napoca, „Babeș-Bolyai” University, Faculty of Psychology and Science of Education

Even if some coaches use the plyometric means in practice in an intuitive manner, they do not benefit from the effects of plyometrics in a in an objective and standardized way. From a strictly performing point of view improving the capacity of "explosion" at the lower limbs' muscles can make the difference between a champion and an average athlete in contemporary sport, because of high motion's speed. Now-a-days the fight is not won by the athlete which is the most powerful but one that is strong in the shortest possible time. This phenomenon is now seen in all sports although it began to be mentioned and analyzed by researchers from the sport's field for a long time. Only now Zatziorski's books, for example, are starting to be appreciated at their higher value.

Our research has a practical answer because all of the criteria applied research: it responds to immediate problems, it is applied to the human subjects, it has real research conditions (indoor, tatami - the designated area on the mat-, running track, etc.), and the results can be used directly.

**The premises** that we used as a starting point in the survey are as follows:

- explosive force is one of the judo's specific effort features;
- improve of the strength, especially explosive force is an important factor both to streamline the process of preparation as well as for obtaining concrete results during fight;
- plyometric training has a strong influence on the event force by improving a particular type of force: explosive force at the lower limbs;
- considering that the effort is shared equally between the two groups (experiment and witness) differences between the two tests, initial and final will reveal the efficiency of a plyometric training programme toward a classical training programme in the respect for improving explosive force at the lower limbs;
- plyometric training can leverage specific energy consumption in judo.

**The assumption** of the research - practical methodological approach that we have made, aimed to argue experimental the following assumptions:

- the use of plyometrics for judoka determine the enhance of explosive strength in the target muscles;
- the increased level of explosive force will lead to improved performance in the implementation of processes that involve high amplitude throwing techniques.

#### **Design of experiment**

The subjects of the research: 22 athletes, judoka.

- aged between 14 and 26 years;
- the level of performance is national team specific at all weight categories.

The sportswomen were divided into two distinct groups of 11 subjects:

- the control group, for which no changes were introduced in training;
- the experimental group, under a special program of plyometric exercises.

**The construction of groups** - for the composition of these groups we have taken as benchmark Standing Broad Jump (the most representative of Eurofit

Fitness Testing Battery to measures explosive leg power) which characterizes the specific effort in judo.

**The description of the plyometric training applied to experimental group**

1. the optimal development of the experiment is 12 weeks;
2. training took place 3 times a week with small exceptions;
3. every training session of experimental group it is equalized with a regular training session control group – the working time for leg's muscles is between 30-45 minutes;
4. the effort is gradual increased, from simple to complex and from easy to difficult;
5. exercises are adapted to the particularities of sport (judo).

The training included a number of 12 plyometric exercises which we have considered optimal for the specific preparation of athletes. Each plyometric exercise is described the expanded paper.

During the training programme for control group we have been used exercises in accordance with planning documents established by coach coordinator.

- Tests:**
- vertical jump test;
  - standing broad jump test;
  - 10 x 5 meter shuttle run test;
  - MGM modified test;
  - technical test.

The initial and final testing was identical for both groups.

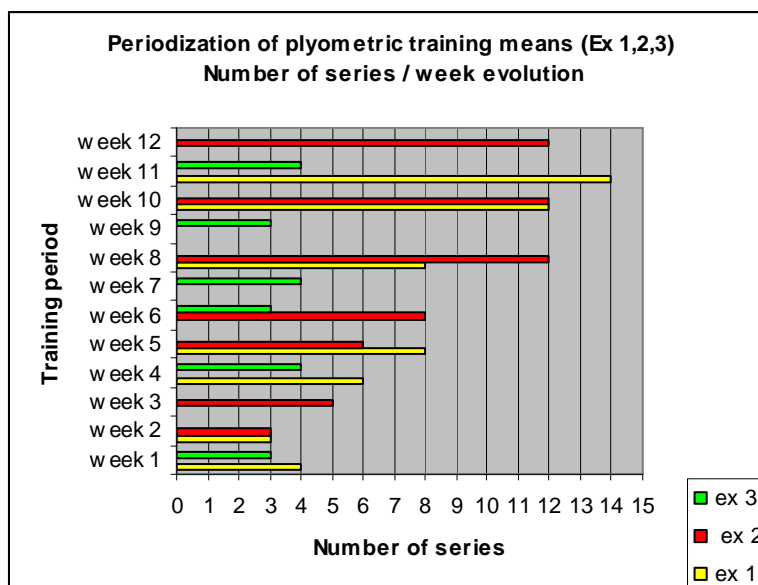
**Table 1.** The training used during the 12 weeks of the experiment - on the right of each exercise appears the number of sets made and the repetitions interval (between 10 and 14 for example).

Used means	week 1	week 2	week 3	week 4	week 5	week 6	week 7	week 8	week 9	week 10	week 11	week 12
EX 1	4x2 0	9x2 0		7x2 0	12x 20			6x3 0		6x3 0	9x2 0	
EX 2		7x1 0 -14	5x1 2		6x1 2 -14	8x1 4		7x1 4		8x1 2		10x 12
EX 3	6x1 2			11x 10		11x 14	8x1 0- 12		12x1 2-14		14x 10 -12	
EX 4	3x8 -12		6x1 0			10x 6	8x1 0	12x 6	13x8 -10		13x 8-10	
EX 5		8x8 -12	5x1 0	10x 10	10x 8 -12			11x 8 -12		8x8		12x 12
EX 6		7x1 0		9x8	8x1 0		4x1 0		10x1 0		10x 12	11x 14
EX	4x5		10x			11x	7x1	7x1			12x	12x

7			5			10	4	4			10	14
EX 8						3	3		4	5	5	7
EX 9	6x1 0	8x1 2		6x1 2	8x1 2 -14		6x1 0- 14	9x1 0	10x8			
EX 10			6x5 -10	6x8- 10		7x1 0-14		6x1 0	8x8- 12	7x8	7x1 0	6x1 0
EX 11							2	4	3		5	2
EX 12	4x1 2	7x1 2	6x1 2		8x1 0 -14				8x12	6x1 4		10x 12 -14

**Planning** - in the paper we described the load per week of each exercise in respect with plyometric means periodization. Here we present the example of the first 3 exercises:

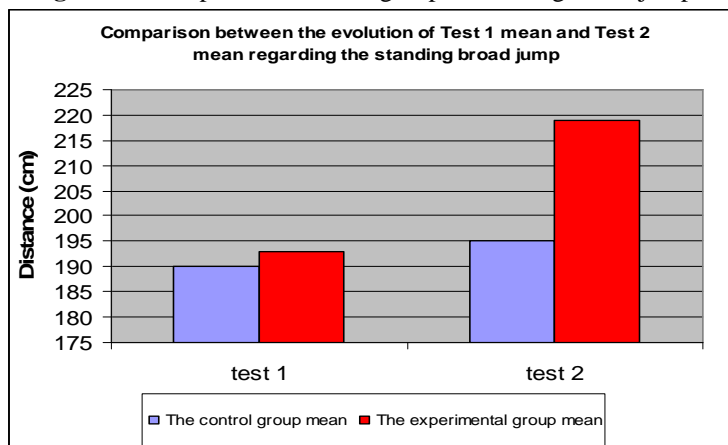
**Diagram 1.** The evolution of 12 weeks of training



The processing of statistical data has been achieved through the use of the SPSS and Excel. It has been sought the verification of the statistical assumptions and the establishment of a significant or insignificant differences between the two groups of athletes through the T Test and ANOVA Test.

## Interpretation of the results

**Diagram 2.** Comparison between groups - standing broad jump test



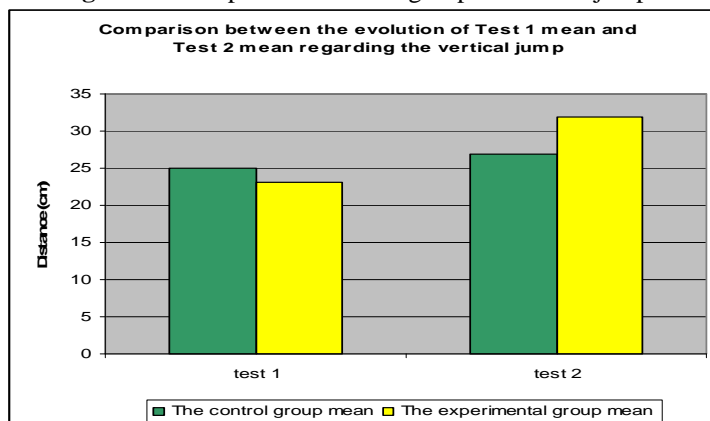
**Table 2.**

**Comparison between groups - standing broad jump test**

Control group mean			Experimental group mean			
TEST 1 [cm]	TEST 2 [cm]	TEST t	TEST 1	TEST 2	TEST t	TEST F
190	195	$t_c > t_s$	193	219	$t_c < t_s$	$0.007 < 0.005$

- control group:  $t_c > t_s$  (null assumption is confirmed, there are no significant differences)
- experimental group:  $t_c < t_s$  (null assumption is not confirmed, there are significant differences)
- F test:  $0.007 < 0.005$  (there are significant differences between the two groups at the final results)

**Diagram 3.** Comparison between groups – vertical jump test



**Table 3.****Comparison between groups – vertical jump test**

Control group mean			Experimental group mean			
TEST 1 [cm]	TEST 2 [cm]	TEST t	TEST 1	TEST 2	TEST t	TEST F
25	27	0.02<0.05	23	32	0.00<0.05	0.035<0.05

- control group: there are significant differences (null assumption is not confirmed)
- experimental group: there are significant differences (null assumption is not confirmed)
- F test: the difference is significant between the two groups at the final results (experimental group recorded a significant increase in the vertical jump value)

**Table 4.****Comparison between groups - 10 x 5 meter shuttle run**

Control group mean [sec]				Experimental group mean [sec]			
TEST 1	TEST 2	TEST t	TEST 1	TEST 2	TEST t	TEST F1	TEST F2
18	18	0.472>0.05	18	21	0.001<0.05	0.925>0.05	0.002<0.05

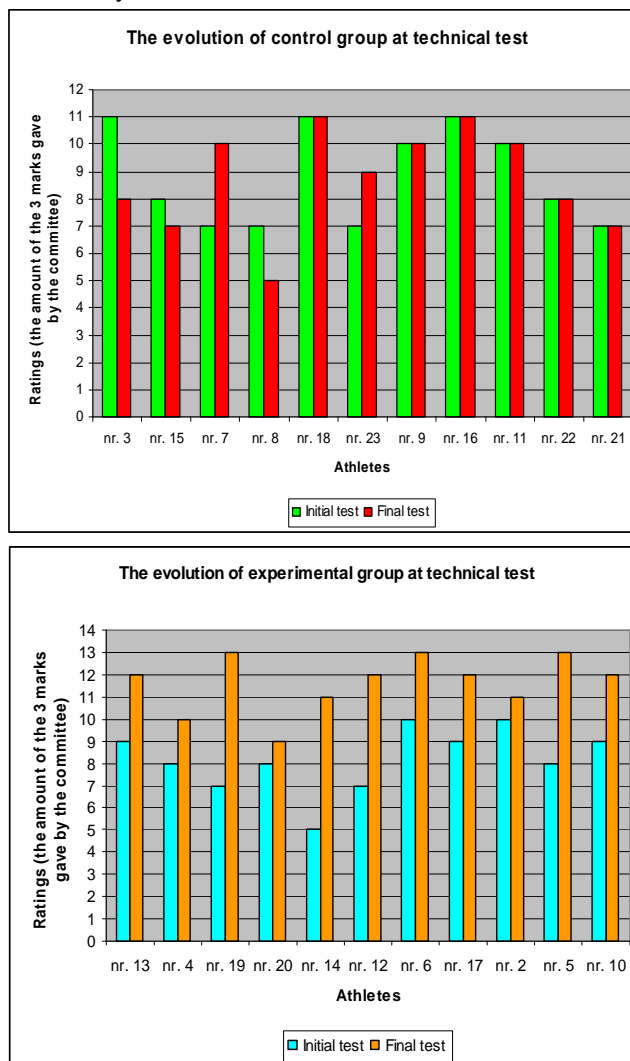
- control group: 0.472>0.05(no significant differences between the CF values at the initial and final testing)
- experimental group: 0.001<0.005(there are significant differences between the CF values at the initial and final testing)
- F1 test: 0.925>0.05 (there are no significant CF values differences between the two groups in the initial phase of tests)
- F2 test: 0.002<0.05 (there are significant CF values differences between the two groups in the final phase of tests)

**Table 5.****Comparison between groups - The MGM modified test**

	Control group mean [sec]			Experimental group mean [sec]		
	TEST 1	TEST 2	TEST t	TEST 1	TEST 2	TEST t
Ground time	191.63	184.27	0.075>0.05	191.45	170.36	0.000<0.05
Air time	392.90	401.90	0.373>0.05	404.63	474.63	0.000<0.05

- control group - Ground time: 0.075>0.05 (there are no significant differences between the jumps' values of contact with the ground at the initial and final testing)
- experimental group - Ground time: 0.000<0.05 (there are significant differences between the jumps' values of contact with the ground at the initial and final testing)
- control group - Air time: 0.373>0.05 (there are no significant differences between the amounts of air time at the initial and final testing regarding the jumps' values)
- experimental group - Air time: 0.000<0.05 (there are significant differences between the amounts of air time at the initial and final testing regarding the jumps' values)

**Diagram 4.** Analysis of test results from technical test - The control group



- the experimental group reveals a progress for all its members
- the frequency of marks noted by 4 (fine) increased from 5 values in the initial test at 17 values in final test
- the frequency of marks noted by 5 (very good) increased from 0 values in the initial test at 6 values in final test
- finally, the type of training used by this group **had a strong influence on the parameters monitored by this test**

### Conclusions

- On the standing broad jump test experimental research has highlighted increases in the length of jump in both groups. The difference lies in the fact that the increases seen in the experimental group were statistically significant.
- Statistical analysis in this case confirmed the influence of independent variable (the type of training) on the dependent variable (power of legs' musculature – singularized by the jump's length).
- ANOVA analysis provides information about the differences between the two groups, compared with each other. Thus, the significance F test to the final comparison tests has the value of 0.007, and a value of significance less than 0.05 indicates that there are significant differences between the two groups at the final results of the standing broad jump test.
- The significance T test is 0.001, less than 0.05, which indicates that there are significant differences between the CF (coefficient of fatigue) at the initial and final testing of the experimental group. These developments indicate the presence of a significant anaerobic power (rated by CF) revealed to experimental group after the stage of plyometric training.
- Statistical analysis for the MGM test adapted to ground time shows that the significance T test is  $0.00 < 0.05$ , which indicates that significant differences EXIST between the time of ground contact for jumps at the initial and the final testing of the experimental group. This value indicates significant improvement of the capacity of command and control of the muscle contraction (the 'explosion') at the lower limbs at the experimental group as a result of plyometric training.
- For the air time the significance T test is  $0.00 < 0.05$ , which indicates that significant differences EXIST between the amounts of jumps' air time at the initial and the final testing of the experimental group. This value indicates significant improvement of the capacity of muscular mobilization (power) to the lower limbs at the experimental group as a result of plyometric training.

The objectiveness of training and evaluation process of the subjects of the two research groups has allowed the verification of assumptions. The results obtained show the efficiency of training through the application of plyometric training methods and means.

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## ACROBATIC GYMNASTICS IN SCHOOLS – METHODOLOGICAL ASPECTS

PAȘCAN IOAN<sup>1</sup>, ȘANDOR IOSIF<sup>1</sup>, PAȘCAN ADRIAN<sup>1</sup>

**ABSTRACT.** This paper presents the results of an inquiry based on an open questionnaire addressed both to teachers and pupils with reference to the significance of the methodology of acrobatic gymnastics in secondary school.

**KEYWORDS:** questionnaire, open questions, acrobatic gymnastics, secondary school.

**REZUMAT.** *Gimnastica acrobatică în școli - aspecte metodologice.* Această lucrare prezintă rezultatele unei investigații pe bază de chestionare adresate atât profesorilor cât și elevilor, investigație referitoare la importanța metodologiei gimnasticii acrobatice în gimnaziu.

**CUVINTE CHEIE:** chestionar, întrebări deschise, gimnastică acrobatică, gimnaziu.

The paper presents the conclusions obtained following an inquiry based on an open questionnaire addressed both to teachers and pupils with reference to the significance, place methodology of acrobatic gymnastics in the 5<sup>th</sup>-8<sup>th</sup> grade pupils. The aims of this study are to complete the data obtained until now on this particular topic and to include into this investigation a representative sample of pupils from the 5<sup>th</sup>-8<sup>th</sup> grades and another one for the teachers.

The questionnaires included a series of items (both of opinion and of knowledge), in order to obtain useful answers to the finding research study. The investigation has been applied in January – May, 2007.

The open questionnaire applied method facilitated the elaboration of free answers to the question (Appendices 1 and 2). The questionnaires addressed to pupils included information regarding the age, form, attended school, sex and the date of completion; the questionnaire for teachers referred to the academic background (the faculty graduated), the length of teaching service, the didactic degree, sex, specialization, the date of questionnaire completion and the place of performing their function.

The questionnaires were completed by 643 subjects, out of which 440 pupils and 203 teachers. The pupils derived from the school units Cluj-Napoca town and Cluj district.

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<sup>1</sup> "Babeș-Bolyai" University of Cluj-Napoca; Physical Education and Sport Faculty; e-mail: ioanpascan@yahoo.com

In selecting the participant schools from Cluj-Napoca, the following criteria were applied:

- The territorial division of the town (central area and residential districts);
- The existent material resources for teaching and learning the school acrobatic exercises;

The pupils' selection was done by the method of the stratification sampling "implying the collectivity classification according to one or several characteristic features" (Ionescu, M., 2000, p.270). Each form was subdivided into two groups, as per the sex criterion (boys and girls separately). Both in case of boys and girls were into account two criteria, as follows: the school performances as well as the evaluation of the results with the physical education obtained from the teacher. From each group were selected one or two subjects (proportionally to the subgroup size). Table 1, illustrates the place as well as the number and sex of subjects comprised in the study. The teachers were selected from urban and rural schools belonging to Cluj and to adjoining district. In table 2 are shown the places of subject's activity, the length of teaching service as well as the number of teachers answering to our questionnaire.

**Table 1.**

**Table comprising the places and number of pupils in each class**

No.	Place	Number of pupils in each form								Total
		5 <sup>th</sup> form		6 <sup>th</sup> form		7 <sup>th</sup> form		8 <sup>th</sup> form		
		boys	gilrs	boys	girls	boys	girls	boys	girls	
1.	Cluj-Napoca	24	26	26	28	22	24	20	22	192
2.	Turda	5	5	6	8	4	4	4	4	40
3.	Dej	4	4	4	6	5	5	4	4	36
4.	Câmpia-T.	4	4	4	4	2	2	2	2	24
5.	Gherla	3	3	3	3	2	2	2	2	20
6.	Huedin	2	2	2	2	2	2	2	2	16
7.	Mediu rural	14	16	14	14	15	13	12	14	112
TOTAL		56	60	59	65	52	52	46	50	440

It should be mentioned that for the questionnaires completed by teachers from Cluj-Napoca town and Cluj District we visited each school unit comprised in this investigation, contacted the teachers of physical education, offering supplementary information to the reasons of our finding study and asking their support in accomplishing it.

**Table 2.**

**Table comprising the number of teachers according to places and length in service**

No.	Place	Number of teachers/length in service					Total
		1-5 years	6-10 years	11-15 years	16-20 years	More than 20 years	
1.	Cluj-Napoca	7	8	15	26	32	88
2.	Dej	1	2	-	2	3	8
3.	Turda	1	1	2	2	4	10
4.	Câmpia-Turzii	-	-	1	3	2	6
5.	Gherla	1	1	1	-	2	5
6.	Huedin	-	1	-	1	1	3
7.	Mediul rural j. Cluj	6	6	2	2	4	20
8.	Bistrița	2	3	2	5	6	18
9.	Oradea	2	3	4	3	4	16
10.	Zalău	3	2	5	3	2	15
11.	Tg.-Mures	1	3	2	3	5	14
<b>Total</b>		<b>24</b>	<b>30</b>	<b>34</b>	<b>50</b>	<b>65</b>	<b>203</b>

However, a number of 43 teachers from the adjoining districts completed the questionnaires during the refresher courses for professors in ordinary and for the 2<sup>nd</sup> didactical degree, held at the Faculty of Physical Education and Sports in Cluj during the 2007 year. The rest of the teaching staff (20) completing their academic studies as extramural students underwent the questionnaire during the examination session of April 2007.

It should be mentioned that before the onset of the so called investigation, a pilot inquiry comprising a small number of subjects – 14 teachers and 30 pupils from school units in Cluj-Napoca - was carried out. As a result of processing and analyzing of the obtained responses (the questionnaires pre-testing), the conclusion has been drawn that a number of three questions listed in the pupils' questionnaire and two questions in the teachers' questionnaire should have been reformulated. Two questions were eliminated from the two questionnaires, in case of the teachers elimination being motivated by the fact that the question referred to a rather general aspect; as for the pupils, the omitted questions did not correspond to the level of knowledge – preparation of the subjects.

## CONCLUSION

This study revealed both the positive and a proportion of the negative aspects regarding the methodology of acrobatic gymnastics in school. Among the most important positive aspects we mention the following:

- ◆ There is a large amount of literature in the realm, both autochthonous and from abroad approaching the methodology of the school acrobatic gymnastics;

- ◆ The new curriculum is more „flexible” and better structured, giving the teacher the opportunity to achieve one’s instructive objectives (the reporting objectives) within the framework of acrobatic gymnastics classes depending on the existing conditions and material resources in school;

- ◆ There are school units provided with good and even very good didactic resources for acrobatic gymnastics;

- ◆ A small proportion of the teachers is preoccupied by the implementation of active participating educational methods that leads to the achievement of classes with attractive and diversified content;

- ◆ Both our findings and the subjects’ responses in the two questionnaires provide supporting evidence for the interest manifested by a high majority of the pupils in the 5<sup>th</sup>- 8<sup>th</sup> forms towards this sports branch;

- ◆ The pupils’ knowledge level is heterogeneous; however, even under minimal conditions the curriculum requirement are observed.

As for the negative aspects, though part of them are induced by objective causes, the great majority are due to subjective reasons. Among the negative aspects generated by objective factors are:

- ❖ Material resources inadequate to the development of the instructive process of acrobatic gymnastics under adequate conditions;

- ❖ Insufficient number of hours allocated ,according to the timetable, to the learning of elements comprised in the curriculum;

- ❖ Lack of continuity in pupils’ training between the primary and grammar school;

- ❖ Very poor motor abilities in pupils deriving from primary school;

- ❖ Little spaces allocated to sports activities, schoolgirls and schoolboys practicing sports activities together, two or three forms present at the same time within the gymnasium.

Regarding the negative aspects related to subjective factors we mention those depending of teacher activity:

- ▶ Deficient preoccupation for the development of psychomotor aptitudes requiring by the acrobatic elements learning;

- ▶ The specific method procedures of the acrobatic gymnastics are very seldom applied (sometimes even omitted);

- ▶ Within the framework of acrobatic elements learning are rarely created some „problematic issues” that must be solved by pupils themselves or assisted by teacher/school mates;

- In many cases the explanations have an outward characteristic, the teachers do not lay stress on the element's true name and do not show the „key” moment of the movement;
- The significance of the learnt elements to everyday life or their contribution to accelerate the learning of motor actions belonging to other sports disciplines are not revealed;
- Within the framework of lessons having an acrobatic gymnastics thematic teachers do not introduce almost at all the acrobatic games;
- The majority of the teaching staff are not acquainted with and not consult the recently published literature on acrobatic gymnastics.

Our study on the methodology of school acrobatic gymnastics has revealed the true aspects found within the sports indoor areas.

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## APENDICES

### Appendix 1

#### QUESTIONNAIRE (for teachers)

In order to optimize in pupils in the 5<sup>th</sup>-8<sup>th</sup> forms the acrobatic gymnastics training comprised in the curriculum, your opinion regarding this issues would be of a great assistance.

The brief and sincere answers will have a significant value in improving the instructive process of the acrobatic gymnastics taught with the 5<sup>th</sup>-8<sup>th</sup> forms.

Graduated from the Faculty .....

Length of teaching service.....

Didactic degree.....

Specialization .....

Gender.....

Date.....

1. What is your opinion about the new physical education curriculum for the gymnastics taught in the 5<sup>th</sup>-8<sup>th</sup> forms? .....
2. What is your opinion regarding the curriculum requirements for acrobatic gymnastics with the 5<sup>th</sup>-8<sup>th</sup> forms? .....
3. What material resources do exist for acrobatic gymnastics (standard hall, improvised rooms, mattresses a.s.o.)?  
.....
4. In your opinion, which are the most important psychomotor attitudes required by the acrobatic gymnastics?  
.....
5. What is your opinion regarding the pupils in the 5<sup>th</sup>-8<sup>th</sup> forms attitude towards the acrobatic gymnastics?  
.....
6. Which are the teaching methods applied by you for the learning of the acrobatic elements with the 5<sup>th</sup>-8<sup>th</sup> forms?  
.....
7. In your opinion, which would be the causes determining an insufficient learning of some acrobatic technical procedures with 5<sup>th</sup>-8<sup>th</sup> forms?  
.....
8. Do you introduce acrobatic exercises as a game with these forms? Please give the name of some games.

No

Yes

9. How do you manage with the theoretical for the acrobatic gymnastics  
.....
10. Please give the titles of the books guiding your activity in the acrobatic gymnastics and has helped you with the lessons within the two years?  
.....
11. Should you have suggestion regarding the improvement of the teaching activity with the acrobatic gymnastics, please name  
.....

## QUESTIONNAIRE

(for pupils)

## Appendix 2

Age .....  
Form .....  
School.....  
Gender .....  
Date .....

Please read carefully the questions and try to give ample answers to each item. We are highly interested in receiving your opinions regarding the issues in this questionnaire.

Please do not omit any question.

Thank you!

1. How many hours of physical education or sports activities would you have per week?  
..... hours of physical education  
..... hours of sports activities
2. What do you like/dislike with the physical education class?  
I like .....  
I dislike .....
3. What sports branch would you like to perform preponderantly with the physical education class? .....
4. What kind of exercises do you perform at school during the physical education class?  
Circle the letter/letters representing them  

a) acrobatic	c) rhythmical
b) jumping	d) aerobic

5. Which one do you like the best? Why? .....
6. What aerobic elements have you learnt during the current school year?  
Please name! .....
7. In your opinion, what qualities are requisite to the acrobatic elements learning? Please name! .....
8. Do you think your activity in the acrobatic gymnastics is important? Why?  
.....
9. What are your objectives to be achieved through performing this gymnastics branch? .....
10. Which one of the learnt acrobatic elements was helpful to you in a given circumstance? How and in what situation?  
.....
11. Do you consider that the learnt acrobatic exercises may contribute to a more rapid approach to some technical exercise of other discipline?  
No  
Yes  
Please name .....
12. Do you practice systematically the acrobatic gymnastics outside the physical education classes? If yes, where?  
No  
Yes .....

## STUDY OF WEIGHT TRAINING IN CLUJ-NAPOCA'S FITNESS GYM

VĂIDĂHĂZAN REMUS-CRISTIAN<sup>1</sup>, VOICU ALEXANDRU VIRGIL<sup>2</sup>,  
BOROS-BALINT IULIANA<sup>2</sup>, PRODEA COSMIN<sup>3</sup>

**ABSTRACT.** This study targeted to fitness instructors from Cluj-Napoca's fitness centers. It gave us useful information about the practice of weight training in our gyms.

**KEYWORDS:** fitness; weight training; questionnaire; performance.

**REZUMAT.** Studiu privind antrenamentul cu greutăți în sălile de fitness din Municipiul Cluj-Napoca. Acest studiu a avut ca țintă eșantionul format din instructorii care activează în antrenamentul cu greutăți în Municipiul Cluj-Napoca. El a furnizat informații utile pentru cei care vor să-și construiască o părere despre fenomenul din sălile de fitness în care se practică antrenamentul cu greutăți.

**CUVINTE CHEIE:** fitness; antrenament cu greutăți; chestionar; performanță

### Introduction

We are in a period during which the increasingly more people are choosing the fitness centers. Probably due to the fact that the time spent in front of the computer in recent years reveals its consequences on the human body. Maybe the advertising brings tangible contribution to this assault of fitness gyms. On the other hand, who does not want to look good?

Whatever the motivation of this choice important is that people want to practice exercise, in one form or another. What is imperative is to evaluate as closely as possible if their assistance received in these centers is conducted between safety limits, and conducted to meet the needs of their members, especially in those where weight training is practiced.

The manner in which practitioners are treated and ideas that are transmitted by instructors from these fitness centers depends to a very large extent promoting healthy this type of activity and expanding the practice of training with weights to as many segments of population.

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<sup>1</sup> Cluj-Napoca, „Avram Iancu” High School

<sup>2</sup> Cluj-Napoca, „Babeș-Bolyai” University, Faculty of Physical Education and Sport

<sup>3</sup> Cluj-Napoca, „Babeș-Bolyai” University, Faculty of Psychology and Science of Education

Training with weights is frequently used by many athletes in the total training programme. This type of training, with diverse and varied objectives, is used by people who do not practice sports performance, being included, increasingly more, in sport for all.

Features for this type of training is a system specific exercises with weights addressed primarily physical development, a system of specific equipment and accessories, and principles and methods developed following scientific research and practical results achieved over the years.

### **The aim of the study and assumptions**

The aim of this study is to analyze the phenomenon of weight training from the perspective of persons responsible for creating and implementing training programs in the fitness centers of the Municipality of Cluj-Napoca. All these people are the ones who must ensure the protection and proper training for every member.

Assumptions of the study:

- Instructors are practicing weight training.
- Instructors have specialized studies in the field of weight training.
- Instructors from fitness centers collaborate with personal trainers in the field of weight training.
- Instructors, the vast majority, perform as personal trainers in this area.
- Financial motivation for fitness instructors that work in fitness centers is not in the first three places.
- Fitness instructors know their job and are able to consistently indicate minimum five conclusive advantages of weight training.
- The instructors that work in fitness centers consult periodically specific materials in the field of weight training.

### **Study subjects**

Place of the study was Cluj-Napoca city. This study was conducted during the period of 18 December 2007 to 22 April 2008. During this period we have tried to apply the questionnaire to the largest possible number of instructors in the field of weight training.

There have been visited over 25 locations, some of them several times, succeeding the completion of 42 questionnaires. It noted two refusals, and in some locations missing instructors.

**Table 1.**

**Gender centralization of the subjects**

Gender	Number of the subjects	%
M	32	76.19
F	10	23.81

As regards the average age of respondents' instructors, it is very close.

**Table 2.**

**The average age**

Gender	Number of the subjects	The average age
M	32	26.16
F	10	26.40

**Table 3.**

**Study level of the subjects**

Study level	Number of the subjects	%
high school	26	61.90
higher education	15	35.71
master degree	1	2.38

### **The method of working**

Data was collected through the questionnaire. He took questions in the structure of closed and open alternatives. Built from a number of 23 items, they were structured in two parts.

Part I of the questionnaire contains items aimed at gathering data on age, gender and level of education of instructors. The first item is introduced to attach a questionnaire to each unique identification number.

The items from the second part were structured in several groups with the same objectives.

The first three items aimed instructors' experience in practice of weight training. The first and the second item are closed questions; the third item is open question.

The fourth item (closed question) and fifth item (open question) have been introduced to determine whether instructors have specialized studies in the field of weight training and what is cumulative duration of these studies.

To obtain information on the relationship with personal trainers in the field of weight training were introduced items six (closed question), seven (open question), eight (closed question), and nine (open question). The items seven and nine are pursuing this link. The ninth item was built as an open question to find out what is the attitude and mentality of the instructors as regards the relationship with other specialists of the field.

The item number 10 (question that supports many variations response), and the item number 11 (open question) were introduced to collect data on the instructors' experience in the field. It was aimed, also, to find out how many of those who work as instructors performs like individual employees as personal trainers in weight training.

The twelfth item (open question) was introduced to find the reasons that fitness instructors have chosen to provide services in the field of weight training.

The most important question in terms of minimum knowledge related to the weight training is thirteenth item. It was built as an open question with a maximum of five lines available to respond.

The next three items (14 - closed question, 15 - alternative question which supports several variations of response, 16 - alternative question which supports several variations response) collect data on the concerns of development of the instructors in the field weight training.

The items number 17 and 18, build in the form of questions closed, are important in terms of specialized materials in this field. Thus, it aims to find out the opinion of those who perform in weight training on the existence of qualitative and quantitative materials. We were trying to find out if the instructors are pleased by Romanian books, and by Romanian magazines that exists on the market.

The last item (closed question) refers to the desire of instructors to develop and improve in this area.

## Results

Next it will be presented only the data which have close connection with the alleged assumptions.

Item no. 1 - Do you practice weight training?

**Table 1. – The practice of weight training**

Answer	Number of the subjects	%
YES	42	100
NO	0	0

All subjects are practicing weight training.

Item no. 4 - Are you accredited with specialized studies in this area?

**Table 2. - The instructors based on studies in the field of specialized weight training**

Answer	Number of the subjects	%
YES	17	40.48
NO	25	59.52

Most fitness instructors who perform in this area have not specialized studies in the field of weight training.

Item no. 6 - Have you ever addressed to a personal trainer?

**Table 3. - Collaboration with professional personal trainer in weight training**

Answer	Number of the subjects	%
YES	10	23.81
NO	32	76.19

A quarter of the subjects have worked with personal trainer in the field of weight training.

Item no. 8 - Do you want to collaborate with a personal trainer in the future?

**Table 4. - Working with personal trainer in the future**

Answer	Number of the subjects	%
YES	6	14.29
NO	36	85.71

A small percentage of respondents instructors (14.29%) have expressed interest to collaborate in the future with a personal trainer.

Item no. 10 - Do you perform in this area, as independent personal trainer and/or fitness instructor employee?

**Table 5. - The number of instructors who perform as personal trainer**

Answer	Number of the subjects	%
independent personal trainer	7	16.67

Of the total respondents 16.67% instructors are working in the field of weight training as personal trainers.

Item no. 12 - The reasons for which you have chosen to perform in this area?

**Table 6. - The reasons that determines the instructors to perform in this area**

Reason	Number of the subjects	%
of pleasure	27	64.29
he/she likes to help people develop	5	11.9
he/she have practiced weight training for years	5	11.9

weight training is related to personal studies	5	11.9
this job gives them the opportunity to keep in shape	5	11.9
environmental	4	9.52
flexible programme of work	2	4.76
because of contentment	2	4.76
financial motivation	2	4.76

Item no. 11 - Are you able to mention a few advantages of weight training?

**Table 7. - Centralization of data regarding advantages of weight training mentioned by instructors**

Result	Number of the subjects	%
they have mentioned 5 advantages	4	9.52
they have not mentioned any advantage	2	4.76

Only four subjects have been able to express coherently and indicate five conclusive advantages of weight training.

Item no. 14 - Do you consult periodically materials in the field of weight training?

**Table 8. - Centralization of data regarding the interest of subjects for specialty materials in the field of weight training**

Answer	Number of the subjects	%
YES	39	92.86
NO	3	7.14

Three of the subjects are not interested to the materials in this field.

### Conclusion

- The first assumption was verified. All respondents are practicing weight training, most of them having at least 5 years old in workouts with weights.
- The second assumption was verified only in a proportion of 40.48%. More than half of the instructors have not specialized studies in the field of weight training.
- A third assumption has not been fully verified. Only a third of the instructors have worked with personal trainer and fewer than 15% wish to collaborate in the future with a personal trainer, almost half of them claiming that did not need the services of such a specialist.
- Only 16.67% of instructors providing services as personal trainer in the field of weight training. All those who provide such services have at least a year old, more than half of them having at least two years old.

- The fifth assumption has been verified in full. Financial motivation is on the fourth place.
- The sixth assumption has been verified in a very small percentage. Of 42 subjects, 17 with specialized studies in which 10 subjects with a minimum of two years of study in weight training only 4 subjects have been able to mention 5 advantages of weight training and between.
- Last assumption has not been verified 100%. Not all instructors consult periodically materials in the field of weight training.

The biggest question is raised regarding the knowledge of instructors as regards the benefits of exercise with weights. The result in a very high percentage is that respondents' instructors do not know what the use of their job is. This, therefore, gives rise to doubts as regards how to meet the weight training objectives in the fitness centers, both the quality and quantity.

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## THE NECESSITY OF WEIGHT TRAINING FOR EVERYONE'S FITNESS

VAIDHAZAN REMUS-CRISTIAN<sup>1</sup>; VOICU ALEXANDRU VIRGIL<sup>2</sup>

**ABSTRACT.** Weight training has a great potential which can be used both for maintaining and improving health and to prevent the health impairment. This article underlines the potential of weight training applied in everyone's life, and presents its benefits revealed by several organizations as a result of specific studies conducted in recent years in this field.

**KEYWORDS:** fitness; weight training; resistance training; strength training; health; vigor; power.

**REZUMAT.** Necesitatea antrenamentului cu greutăți în fitnessul pentru toți. Antrenamentul cu greutăți are un potențial benefic foarte mare, potențial care poate fi folosit atât pentru menținerea și îmbunătățirea stării de sănătate, cât și pentru prevenirea pierderii acestei stări. Articolul de față prezintă acest potențial al antrenamentului cu greutăți aplicat în fitnessul pentru toți, centralizând beneficiile prezentate de mai multe organizații specifice ca urmare a studiilor realizate în ultimii ani în acest domeniu.

**CUVINTE CHEIE:** fitness; antrenament cu greutăți; sănătate; vigoare; putere

### Introduction

Weight training (known also by resistance training or strength training) is an activity embraced by a higher number of people in our country. Because of its specificity weight training can play an important role in maintaining and improving health. The need for weight training programmes is being highlighted by many associations with specific activity throughout the world. To be applied as well as it can be we need to understand this activity both practical and theoretical.

The benefits of weight training programme heavily depend on the transposition of the most accurate personal objectives in the real objective, able to be satisfied with specific means of weight training. This operation will be much easier if we know what weight training can offer.

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<sup>1</sup> Cluj-Napoca, „Avram Iancu” High School

<sup>2</sup> Cluj-Napoca, „Babeș-Bolyai” University, Faculty of Physical Education and Sport

### **The concept of fitness**

Fitness is defined in English dictionary as "the state of being physically healthy and strong" (Macmillan English Dictionary, 2002).

To be more precise we define fitness as that state of physical, emotional and mental health that allows you to perform daily activities with force, being the result of high energy reserves.

This complex definition is more in line with the new trends in the field which suggest that fitness must be seen as a complex concept. Many authors described the term fitness as a concept consisting of three-dimensional term: physical fitness, emotional fitness and mental fitness. A person, to have an optimal level of fitness, must be balanced in all those three aspects.

Depending on the specific particularities of each person and, going further, different needs of each segment of the population, there are different levels of physical fitness (Sbenghe, T., 2005). Thus "an adult fitness usual means of his/hers physical activity at the end of the day working or at the end of the week, for an elderly fitness is the ability to maintain proper independence in the house, to walk greater distances or work in the garden, for a pupil or student (who is not an athlete) fitness means daily participation in the programme of physical and mental activities required by school "(Sbenghe, T., 2005, p. 515).

Physical fitness has two major components, called general fitness and specific fitness (Nieman, C.D., 1998). General fitness refers to the state of health and wellbeing of the body, and specific fitness refers to specific skills needed to perform in various sports or occupations.

Athletic skills influence individuals' life at the time that they are committed to carrying out some tangible activities (sports or otherwise), but did not influence the maintenance and improvement of health and disease prevention. It has not been scientifically proven that people who have a high level of skills are less exposed to disease (Nieman, C.D., 1998).

Therefore, the most important components of physical fitness are those who can influence individual's health and ability to face daily activities with vigor. They are the result of physical exercises practiced regularly, a balanced diet and a rest well managed in order to recovery functional capacity of the organism as a result of induced stress by engaging in specific physical activities.

The general fitness components are in number of three (Nieman, C.D., 1998):

- Cardiovascular fitness, which indicate the level of cardiovascular system functioning, its ability to face physical activities;
- Body composition, which refers to the relative amount of fat tissue and lean tissue. It expressed, most often, by percentage of body fat;
- Musculoskeletal fitness, which refers to joints' flexibility, muscular strength and muscular endurance.

### **The necessity of weight training**

Human body becomes more efficient as it reaches appropriate levels of fitness. Regular physical exercise practice combined with good nutrition causes a decrease in the time needed for reconstruction and development for all tissues (Bushman, A.B., Clark-Young, J., 2005; [www.seekwellness.com](http://www.seekwellness.com), 2007).

The type of activities that people practice across the life span determines the level of functional ability that they will maintain in their locomotor apparatus with important implications on the entire body. Involvement in weight training programmes plays an important role in delaying and reducing the negative effects that aging has on the human body ([www.acsm.org/cc](http://www.acsm.org/cc), 2007).

Everyday activities are dependent on the muscles force and integrity of locomotor apparatus, thus maintaining its functionality and the improvement or at least maintenance of muscle strength should play a role in every person's lifestyle.

ACSM (American College of Sports Medicine) argues that the ideal living arrangements to ensure the maintenance and development of muscle system, bone system and hormonal system should include weight training (ACSM Fit Society Page, July 2001, Humphries, B.D. - Strength training for bone, muscle and hormones).

At many people daily movement patterns are insufficient or missing for certain muscles. This is due, most often, to the specific of profession that these people practice. Thus, it requires, increasingly more, the implementation of compensatory gymnastics programs that can be improved by including specific training exercises with weights because of the analytical manner of dealing with them, and because of local high efficiency.

The reconstruction of muscle tissue is influenced by the workouts with weights. Indirect evidence shows that regular practice of weight training stimulates the retention of protein in muscles, thereby contributing to the reconstruction of muscle tissue (Wilmore, J., Costill, D., 1993).

Regularly practice of resistance training leads to muscle hypertrophy, becoming thus an important mean of combating muscle atrophy which emphasizes with aging. After three months of weight training, participants in a study, have won over one kilogram of muscle tissue and have lost almost two kilograms of fat ([www.spineuniverse.com](http://www.spineuniverse.com), 2007).

A big advantage of strength training on the muscles is the regain of muscle's strength and the continue improvement of this strength. It seems that this improvement has no threshold limit.

Researchers from Tufts and Harvard universities have collaborated in a study in which people with average age of 90 years participated in a training program with weights. These people have done for three days a week 3 sets of 8 repetitions. They were re-evaluated periodically to maintain the intensity of effort at 80% of 1RM (one repetition maximum). After 6 weeks muscle force increased by 180 percent, and speed has improved with 48 percent ([www.seekwellness.com](http://www.seekwellness.com), 2007).

Another study conducted with people aged up to 90 years, has sought the results of strength training over a period of 8 weeks. The conclusion was that muscle force increased by 174% and the speed has increased by 50% (Price, C., 2002).

Developing muscle strength has special implications on the daily activities, contributing to improving the autonomy of individuals, reducing also the risk of many inconveniences. Stronger muscles means stronger joints, which leads to a better balance and a better stability of the body.

Maintaining or winning certain levels of muscle strength is a major importance in maintaining the independence and the ability to develop muscle power. These issues are becoming increasingly obvious and important as we get older.

At all ages, but especially as the years pass, muscle power is very important not only for sportsmen performance, but also for people who do not practice sport performance.

The muscle power is the ability to produce force in a higher speed or ability to carry out a mechanical work in a short period of time as it is conditional on the amount of muscle mass, but also the ability to activate the muscles.

The decline of muscle power with age is much greater than that of force. This is probably due to transformations that take place in the nervous system (loss of motor units, increased time for analysis and response, decrease of the speed of nervous impulse, etc.) and sensory system with the passage of years and decreased frequency of use.

Gradual loss of power along lifespan leads to inability to correct the losses of balance incurred in certain daily activities, with catastrophic result that can lead to immobilization for long periods of time, even in death.

Falling is the main cause of injury and death for persons over 65 years (Ettinger, H. W., Wright, B. S., Blair, N. S., 2006)). A recent study reported that the weak muscles of the lower limbs are the most important risk factor for falls in the elderly population (Winters-Stone, K., 2005).

The main difference between training for strength and training for power is the speed of the movements. Power may be regained only through specific programmes of weight training. Participants in one study were divided into two groups. One was trained for power and the other made long walks exercises for 12 weeks. The first group had an increase in muscle strength with 22% and at the second group were not seen significant changes (Spirduso, W., Francis, K., MacRae, P., 2005).

Strength training develops power, but not significantly, while training for power develops force significantly. In conclusion, muscle strength and muscle power have direct influence in maintaining balance and improving stability, and weight training is a necessity in this respect.

Weight training improves balance and coordination (Bushman, A. B., Clark-Young, J., 2005; [www.acsm.org/cc](http://www.acsm.org/cc) 2007). A study of women past 80 years, subject to a workout of strength and balance, showed a 40% reduction in risk production falls (Seguin, R., Epping, J., Buchner, D., Bloch, R., Nelson, M., 2002).

Muscle contraction is a stress source for the bone through the insertion of the muscles. Weights training can induce stress mechanic, which maintained in the safety limits, stimulates bone development ([www.acsm.org/cc](http://www.acsm.org/cc), 2007). Several researchers have shown that, practiced regularly weight training prevent loss of bone density in people already affected (American College of Sports Medicine, 2003) and supports reconstruction of bone and muscle (Seguin, R., Epping, J., Buchner, D., Bloch, R., Nelson, M., 2002; Krautblatt, C., 2007; [www.spineuniverse.com](http://www.spineuniverse.com), 2007). This has important implications in the strategy to prevent fractures, but also in preventing and stopping osteoporosis that is not a disease in the clinical sense, but rather a condition ([www.acsm.org/cc](http://www.acsm.org/cc), 2007).

The subjects (postmenopausal women) of a study, conducted over a period of 12 months by researchers at Tufts University, have benefited from improvement in bone density by 1%, muscle strength by 75% and dynamic equilibrium by 13%, following a strength training held only two days a week (Seguin, R., Epping, J., Buchner, D., Bloch, R., Nelson, M., 2002).

It seems that the type of weight exercises does not affect bone reconstruction, but the intensity of effort has a major influence. It requires a large load to stimulate bone structure. After 8 to 12 weeks of strength training the first positive influences on the bone can be observed, but it takes at least 4 to 6 months of training to change bone density (Bushman, A. B., Clark-Young, J., 2005).

Weight training reinforces joints, tendons and ligaments (Krautblatt, C., 2007; [www.seekwellness.com](http://www.seekwellness.com), 2007), stimulating also the secretion of synovial fluid and the feeding of articular cartilage ([www.spineuniverse.com](http://www.spineuniverse.com), 2007).

The thicken of articular cartilages as a result of weight training, along with muscle strengthening advocates the joints in daily mechanical stress management.

Weight training seems to be as strong as a medicinal treatment in combating joint pain. Following a study conducted with elderly that undergone a strength training for a period of 16 weeks, researchers from Tufts University have shown that they have seen a decrease in joint pain by up to 43% (Seguin, R., Epping, J., Buchner, D., Bloch, R., Nelson, M., 2002).

Weight training has positive influences on the cardiovascular system. Following the results of several studies done in this regard, the American Heart Association recommends the practice of strength training to reduce the risk of occurrence of heart disease (Seguin, R., Epping, J., Buchner, D., Bloch, R., Nelson, M., 2002).

Blood glucose level is influenced both short term and long-term by physical activities. Training with weights is a way to maintain control of blood sugar and prevent the occurrence of type II diabetes (Bushman, A. B., Clark-Young, J., 2005). A study conducted over 16 weeks, in which several people have participated in workouts with weights, showed substantial improvements in glucose control (Seguin, R., Epping, J., Buchner, D., Bloch, R., Nelson, M., 2002).

Another important advantage of training with weights is to control the body fat. Training with weights by increasing muscle mass determines an increase

in basal metabolic rate (BMR). For example, each day the body needs more than 35 calories to maintain 500 g of muscle tissue, while for 500 grams of fat needs only 2 calories (Bushman, A. B., Clark-Young, J., 2005). The strength exercises may lead to an increase in BMR up to 15% (Seguin, R., Epping, J., Buchner, D., Bloch, R., Nelson, M., 2002), thereby helping to reduce the percentage of body fat.

Participation in weight training develops self-confidence due to positive changes produced over the entire body, improves body posture, self-esteem (Krautblatt, C., 2007) and helps reduce anxiety ([www.medscape.com](http://www.medscape.com), 2007). Weight training proved to be as strong as antidepressants in combating depression (Seguin, R., Epping, J., Buchner, D., Bloch, R., Nelson, M., 2002).

Weight training has gained popularity in recent years due to positively impact on various categories of population ([www.acsm.org](http://www.acsm.org), the 2007), American College of sports Medicine recommending for each adult a program of physical activities that includes strength training practiced at least two days a week. This should provide training exercises for all major muscle groups ([www.acsm.org/brochures](http://www.acsm.org/brochures), 2007).

### **Conclusion**

Weight training has beneficial influence on the human body that we should not ignore the need to include weight training programmes with in daily routine of each person.

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## PEDOMETER DATA IN MIDDLE-AGED ROMANIAN WOMEN: A PILOT STUDY

RUSU FLAVIA-ILEANA<sup>1</sup>, CÂMPEANU MELANIA<sup>1</sup>,  
DEAK GRAȚIELA-FLAVIA<sup>1</sup>, BOROȘ-BALINT IULIANA<sup>1</sup>

**ABSTRACT. Background:** There is a great lack of information regarding the amount of physical activity performed daily by a Romanian citizen. This pilot study provides pedometer-recorded data on a sample of middle-aged Romanian women.

**Methods:** Data were collected from 20 women with ages ranging from 40-60 years old randomly recruited from Cluj-Napoca. They wore unsealed pedometers (OMRON Walking style II) for 3 days and recorded the number of steps taken daily.

**Results:** Mean age of the sample was 49.35 ( $\pm 1.572$ ) years. Mean height (cm) was 163.90 ( $\pm 1.205$ ). Mean weight (kg) was 65.90 ( $\pm 2.206$ ). Mean steps/day measured by pedometers for three days was 8649 steps a day. The deficit of mean steps/day from daily guideline was 1351 steps a day.

**Conclusions:** The goal of 10,000 steps per day was not reached by the participants to our pilot study, but the mean value of steps/day was close. Based on a categorization by Tudor-Locke and Bassett, the women in the current study on average are somewhat active. More research is needed on this particular topic involving a larger number of participants in order to draw pertinent conclusions.

**KEYWORDS:** pedometer, women, physical activity, walking, assessment.

**REZUMAT. Date de pedometrie prelevate de la femeile de vârstă mijlocie din România: un studiu pilot. Premize:** La ora actuală în țara noastră există foarte puține date referitoare la nivelul de activitate fizică zilnică a cetățeanului român de rând. Acest studiu pilot furnizează date înregistrate cu ajutorul pedometruului de către un eșantion de femei de vârstă mijlocie din România.

**Metode:** Datele provin de la 20 de femei cu vârste cuprinse între 40-60 ani aleator selectate din Cluj-Napoca. Ele au purtat pedometre nesigilate (OMRON Walking style II) timp de trei zile și au înregistrat numărul de pași făcuți zilnic.

**Rezultate:** Media de vârstă a eșantionului a fost de 49.35 ( $\pm 1.572$ ) ani. Înălțimea medie a eșantionului a fost de 163.90 ( $\pm 1.205$ ) cm. Valoarea medie a numărului de pași zilnici calculată pentru cele trei zile de înregistrări a fost de 8649 de pași pe zi. Diferența până la valoarea zilnică recomandată este de 1351 de pași pe zi.

**Concluzii:** Valoarea recomandată de 10,000 de pași pe zi n-a fost atinsă în nici una dintre zile, însă valoarea medie calculată pentru perioada de trei zile a fost destul de aproape. Dacă ar trebui să clasificăm performanța participantelor la studiu, am putea spune că sunt relativ active. Pentru a trage concluzii pertinente referitoare la acest subiect, este nevoie de alte studii cu număr mai mare de participanți.

**CUVINTE CHEIE:** pedometru, femei, activitate fizică, mers, evaluare.

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<sup>1</sup> Babes-Bolyai University; Faculty of Physical Education and Sport Cluj-Napoca; e-mail: flavia\_rusu@yahoo.com

## **BACKGROUND**

Pedometers are economically feasible devices which accurately quantify the number of walking steps that individuals take on a daily basis (2). They were commercially introduced in the 1980's, and since then they were used worldwide in studies aimed at assessing physical activity in humans.

The recommended value of daily steps to be taken in order to achieve health benefits is 10,000 (3). Reaching this goal was found to have positive effects on individuals suffering from hypertension, overweight and obesity (2). Despite all scientific evidence in favor of this recommendation, 10,000 steps per day proves to be an impossible goal for the vast majority of adults living in economically developed countries.

Romania experiences the same unfortunate situation. Although there is a great lack of data regarding the amount of physical activity performed daily by a Romanian citizen, facts like being ranked number 1 in statistics referring to deaths from cardiovascular diseases tell us that we have a serious problem on our hands.

The purpose of this pilot study is to provide data on the current Romanian situation regarding physical activity in middle-aged women. We used pedometers in order to assess the mean steps/day of the participants to the study. This investigation was meant to be a preview of a more complex and ample evaluation of the Romanian's physical activity habits.

## **METHODS**

### **Participants**

Data were collected from 20 women with ages ranging from 40-60 years old randomly recruited from Cluj-Napoca, a town situated in the North-Western part of Romania. They all signed an agreement which stipulated that they willingly take part to the study. All 20 participants succeeded in wearing the pedometer and in recording the data for the time period of 3 days.

### **Procedures**

All participants to the study completed surveys prior to be measured in height (cm) and weight (kg) at the research centre of the Physical Education and Sport Faculty, "Babeș-Bolyai" University of Cluj-Napoca.

The time period chosen for recording physical activity was 3-days. The participants were hand in forms which were structured so that each day the number of steps could be recorded for three time periods (Period 1, morning routine, waking up time to 9:00 am; Period 2, work routine, 9:00 am to 16:00 pm; Period 3, evening routine, 16:00 pm to bedtime) (4). In addition, for each time period were recorded different types of activity. The morning routine included: getting up, personal hygiene, breakfast, preparation for work, and getting to work. The work routine included: using a computer, maintenance activities (e.g., cleaning, sweeping, washing floors), handling folders, intellectual activities, lunch, attending meetings.

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The evening routine included: getting home from work, cleaning activities, laundry, preparing meals, shopping, watching TV, leisure activities, dinner, personal hygiene, and preparation for sleep.

When participants were called in for the assessment, they were explained how to wear the pedometer and how to record the number of steps. They were hand in unsealed pedometers (OMRON Walking style II) and were instructed to wear them either clipped to their waistline, or as a locket, attached to a necklace. They were asked to start recording from the following day, as soon as they get up. As OMRON Walking style II resets itself at 12:00 pm, participants were instructed to be careful when recording the total number of steps for a day (prior to 12:00 pm). They were asked to wear the pedometer all day while doing usual activities, and to remove the pedometer before going to bed. All data from 3 days of recording was used for the analyses performed.

## Analyses

Descriptive statistics were computed for all variables in order to understand the nature of the data with the SPSS for Windows version 15.0 program.

## RESULTS

Mean age of the sample was 49.35 ( $\pm 1.572$ ) years. Mean height (cm) was 163.90 ( $\pm 1.205$ ). Mean weight (kg) was 65.90 ( $\pm 2.206$ ) (Table 1). Mean steps/day measured by pedometers for three days was 8649 steps a day. The deficit of mean steps/day from daily guideline was 1351 steps a day. The results of mean steps/day correspond to data recorded on Sunday, Monday and Tuesday.

**Table 1.**

**Descriptive statistics results for age, height and weight**

		Age (years)	Height (cm)	Weight (kg)
N	Valid	20	20	20
	Missing	0	0	0
Mean		49,35	163,90	65,90
Std. Error of Mean		1,572	1,205	2,206
Median		50,50	163,00	67,00
Std. Deviation		7,028	5,389	9,867
Variance		49,397	29,042	97,358
Range		22	18	39

**Table 2.**

**Correlation results for weight and number of steps/day**

		Weight (kg)	Sunday - P3	Monday - P3	Tuesday - P3
Weight (kg)	r	1	,210	-,135	,028
	p		,187	,286	,454
Sunday - P3	r	,210	1	,510(*)	,131
	p	,187		,011	,291
Monday - P3	r	-,135	,510(*)	1	,060
	p	,286	,011		,401
Tuesday - P3	r	,028	,131	,060	1
	p	,454	,291	,401	

\* Correlation is significant at the 0.05 level (1-tailed).

**Table 3.**

**Paired samples test results**

		Paired Differences					t	df	p (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
Pair 1	Sunday - P3 - Monday - P3	-3038,950	4153,538	928,759	-4982,865	-1095,035	-3,272	19	,004
Pair 2	Sunday - P3 - Tuesday - P3	-2550,050	4969,015	1111,106	-4875,621	-224,479	-2,295	19	,033
Pair 3	Monday - P3 - Tuesday - P3	488,900	5812,613	1299,740	-2231,487	3209,287	,376	19	,711

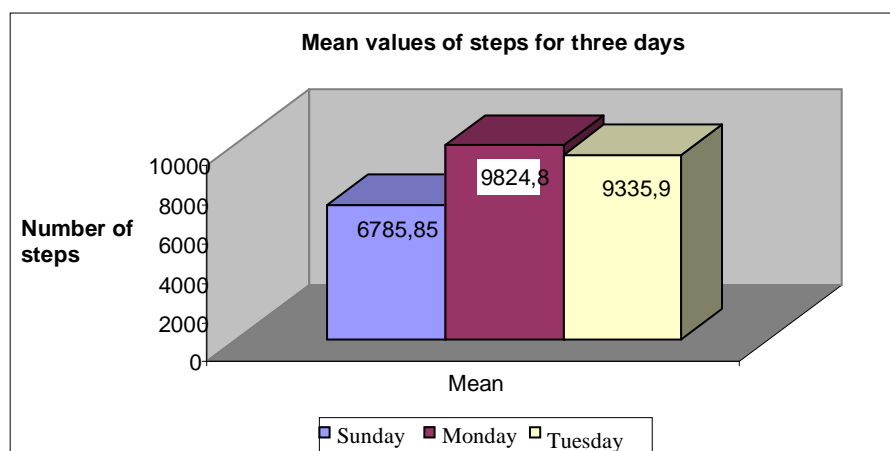
The average number of steps registered by a pedometer during three days of the week (Sunday, Monday and Tuesday) with necessary activities at home and work are shown in Diagram 1. The daily goal of 10,000 steps was not reached either on Sunday, nor on the other two days of the week. The lowest percentage of daily step goal achieved was recorded on Sunday (68%) and the highest one was recorded on Monday (98%).

## CONCLUSIONS

The goal of 10,000 steps per day was not reached by the participants to our pilot study, but the mean value of steps/day was close (8649). If we were to translate this value into an activity level, we would use the indices provided by Tudor-Locke and Bassett (3). These are the following: <5000 steps/day = "sedentary lifestyle", 5000–7499 steps/day = "low active", 7500–9999 = "somewhat active", 10000–11499 steps/day = "active" and > 12500 steps/day = "highly

active". Based on these categorizations, the women in the current study on average are somewhat active. Compared to other studies (5-11), which have concluded that female adults from the economically developed countries are sedentary or low active, our findings could suggest that Romanian middle-aged women are more active than their peers from abroad.

**Diagram 1. The mean values of steps for Sunday, Monday and Tuesday**



Although on average the participants to this pilot study are somewhat active, there are differences of even 5000 steps/day between the values which indicate the number of steps taken daily. The explanation for such a fact could reside in the social status of these women. The office workers, usually with some sort of college degree and a medium annual income, had a lower score on the number of daily steps than the participants with a high school degree and a low to medium annual income with more physically demanding jobs. In addition to that, the women who own their personal car in Romania form a small minority and they are definitely not representative for the low to medium annual income sector of the society. So the lower score on the number of daily steps seen in office workers has two apparent reasons: 1. the sedentary nature of their job, and 2. the fact that they usually drive to work. The conclusion would be that the great differences between the reported values of the daily number of steps exist due to the nature of these women's jobs and, indirectly, due to their annual income. The interesting aspect of this situation would be the close relationship between low income and higher levels of physical activity. This finding contradicts the actual reality of the Western society where low income is associated with low physical activity.

Age has no significant effect on the activity levels. The difference between the group of 40-50 years old women and the group of 50-60 years old women concerning the mean value of the number of steps taken in a 3-days period is very small. This suggest that these women have similar habits, which seems logical given the fact that the age difference is not a big one.

In summary, Romanian middle-aged women seem to distinguish themselves from their peers who belong to the modern Western societies with a couple of characteristic features. On average, they are somewhat active and they walk more if they have a low annual income. More research is needed on this particular topic involving a larger number of participants in order to draw pertinent conclusions.

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## THE MULTIMEDIA TECHNOLOGY IN THE PHYSICAL ACTIVITY

SZABÓ PÉTER ZSOLT<sup>1</sup>, BOGDAN VASILE<sup>1</sup>, BOROS-BALINT IULIANA<sup>1</sup>

**ABSTRACT.** For a developing society, the top technology represents the only chance to break out from the economical impasse. Their hope was the innovation based on the technology to create profitable industries. A few countries, with the income smaller than in the United States, have invested their resources in technology, gaining success beyond their expectations, while other countries are still being powerless. If we could achieve the introduction of multimedia technology in more sporting clubs and competitions, in order to realize the research, we could obtain better results in the sport performance. This is why I am going to specify a few multimedia technologies what we can use if we have them at our disposition.

**Keywords:** multimedia; multimedia technology; physical activity; sport

**REZUMAT.** Tehnologia multimedia în activitatea fizică. Pentru o societate în curs de dezvoltare, tehnologia de vârf reprezintă unica șansă de ieșire din impasul economic. Speranța lor era ca inovația bazată pe tehnologie să creeze industrii aducătoare de mari beneficii. Câteva țări, având venitul pe cap de locuitor de zeci de ori mai mic decât Statele Unite, au investit modestele lor resurse în tehnologie, obținând succese dincolo de cele mai optimiste așteptări ale lor, în timp de altele se zbat în continuare neputincioase. Astăzi, multimedia a devenit mai mult decât o obișnuință, a devenit o necesitate și o modă. Dacă am reuși să introducem în mai multe cluburi sportive și în competiții tehnologia multimedia pentru a realiza o cercetare am obține rezultate mai bune cu siguranță. De aceea voi enumera câteva tehnologii multimedia pe care le putem folosi foarte ușor dacă le avem la dispoziția noastră.

**Cuvinte cheie:** multimedia; tehnologia multimedia; activitatea fizică; sport

### Introduction

The technological support of the new society it is based on the electronically technology of three sections: communication technology, information technology and the multimedia information capacity production. These technologies, based on the development of the digital electronics, led to the apparition of new services and multimedia telematical applications (informatics and communication), which incorporates the sound, image and text and uses all the communication methods (phone, fax, TV and computers). It is important to mention that the development of

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<sup>1</sup> Faculty of Physical Education and sport from Cluj-Napoca, e-mail: peco

these new communication methods and information technology represents an important consideration in increasing the competitiveness of the economical agents, leading to new perspective for a better organization of the work, or in our case increasing the performance in sports, with one purpose: to win the Olympics or the world championships or beating the records [6].

For a developing society, the top technology represents the only chance to break out from the economical impasse. Their hope was the innovation based on the technology to create profitable industries. A few countries, with the income smaller than in the United States, have invested their resources in technology, gaining success beyond their expectations, while other countries are still being powerless [4].

This is due to the fact that the most important factor it is not just placing the development of the science and technology on the top of national priorities, but also it is due to another very important aspect: *the society's attitude towards technology and innovation* [5].

Innovation is a cultural phenomenon and not a scientific one. The culture through his attitude and prejudice that people have regarding risk, through his reward and social statute, can give a dynamism or can inhibit the innovation. The ideas and mentality have a fundamentally important role. And the responsibility of education is to encourage research, competitively and technological innovation, with his enormous advantages [5].

It hasn't been proved yet the existence of a central authority with so much knowledge to be able to predict the path of the future development of technology. It is known an incident at the Bellcore Laboratory, where a Nobel Prize laureate declared, that a screen with liquid crystals is an impossibility. Very polite, the scientists haven't told him, that this screen is already built.

What should be done for the second world countries to make this important technological leap?

Some ideas would be [5]:

- The education of labor force capable to occlude the new technologies; it has to be done a great investment in the continuous education of the managers and specialists. The economical systems are based on the knowledge and on the built social resources (the schools). It is indicative the fact that countries like India, South Korea and China heads the best students towards the elite technical institutions from the United States. Armed with education and experience, they successfully return to their birth countries, where they start competitive businesses. South Arabia has the money to buy, but do not have the cultural surroundings to improve what they have bought.

- The facility of permanent access to the information and the satisfaction of informational needs of all the society members (including disadvantaged persons);

- Initiative improvement advocacy and legislative framework and settlement update, which exists in the informational activity field.

- Deficit reduction in informational assurance and access to information in all country regions, including rural space;
- Automatized local network development assurance and their integration in the national and international informational system through the implementation of the advanced communication technologies.
- The encouragement of the implementation of modern editing technologies, and befriending of the multimedia editing technologies.
- Improvement of the professional level of the experts.

### **Definition of multimedia and multimedia technology notions**

Lately, the notion “multimedia” has become a very used expression. Its origins are in the words “multi” (many) and “media” (information transmission and presentation media). This modern technique, which is accessible for everyone through the computers, has opened a new world in the education and entertainment area.

Multimedia is a computer based method of information display, using communication (text, image and sound) the accent being on interactivity.

In every day life we have the opportunity to interact with these media of information transmission: newspapers and magazines (images and text), television and stereo (video and audio). Multimedia combines all these in our computer.

The majority of the first multimedia type creations had a linear conception, which means that the person could decide if he wants to move to the previous or to the next page. In the interactive multimedia, the person can determine the order of the unroll of information.

Today, multimedia has become more than usual, it has become a necessity and vogue. Most of the computers contain sound cards and CD-ROMs and DVD-ROMs, others even have more complex accessories (diagram accelerator, TV tuners etc). Installing these components on a computer which is already performant, we will be able to obtain more information, beginning with simple text and images and ending with animation and sound.

### **The use of multimedia technology in the sport domain**

If we could achieve the introduction of multimedia technology in more sporting clubs and competitions, in order to realize the research, we could obtain better results in the sport performance. This is why I am going to specify a few multimedia technologies what we can use if we have them at our disposition.

These technologies can be hardware or software, multimedia gear or the program used to process these valuable information obtained with the digital gear.

It is very important to know all the facilities offered by these digital gears. This can be done only if we know very well the gear. This knowledge can be learned from the technical book of the gear, which is translated in many languages for a better understanding.

A very easy to use gear is the digital photo camera, which has the advantage, that we can view the photos right after taking them, without development. Another positive fact is that we can shoot hundreds of photos and delete what we want. It is said, that a photo worth a hundred of words but a movie worth a thousand.

Another digital gear is the digital video camera, which has more facilities vis a vis the digital photo camera. With this gear we can realize the global movement; we can observe the mistakes, which can be corrected especially if the sportsman doesn't feel the mistake. We can realize short players using them in scientific work. In this way we are going to obtain new exercises and many facilities increasing the sport performance, or at least we can realize a correct biomechanical movement [1].

Another very important gear for the visualization of the recorded material is the video projector. With the help of the projector we can project the material on the wall, so a bigger number of people can see it. It is a very pleasant way of seeing, especially if we don't have the possibility to physically present some biomechanical perfectly realized movements, and if the whether is not favorable or we don't have a proper track (this example refers to those small towns where doesn't exists tartan, polytan or mondo track).

As software we can specify several programs which helps us to process these materials: ACDSEE program; PINNACLE STUDIO; VideoStudio 7 SE DVD, Adobe encore DVD 1.5.0.41656, Adobe Premiere pro 7.0, Cool3D 3.0 SE – ad 3d title to the movie, Pinnacle Impression DVD Pro 2.2, Ulead COOL 3D 2.5 SE, Ulead MediaStudio Pro 6.0, Ulead PhotoImpact 6.0, Ulead Photo Explorer 7.0 PRO [6].

All these programmes are “friendly”, only patience and curiosity is needed for an easy use.

Some examples for kinogramme In athletics:

#### 1. Jogging

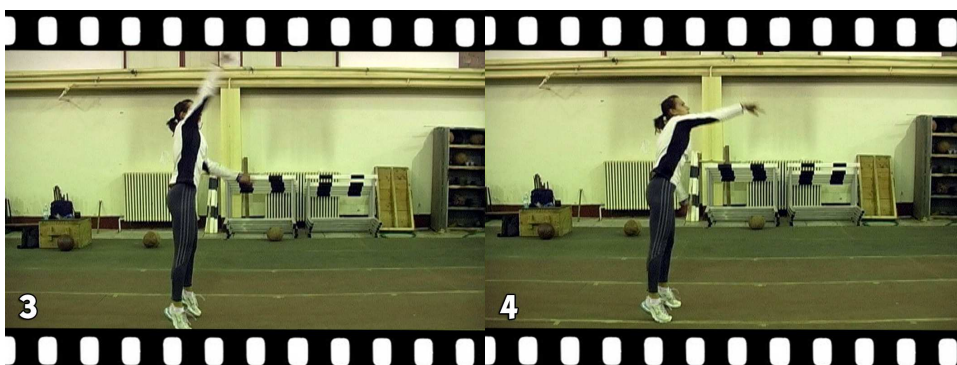
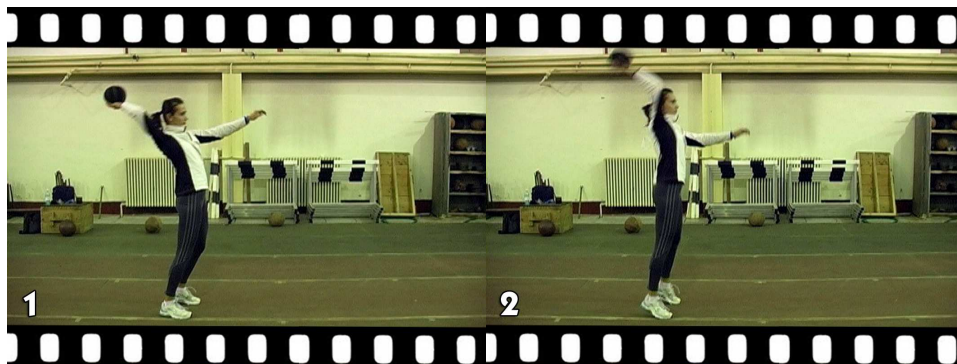


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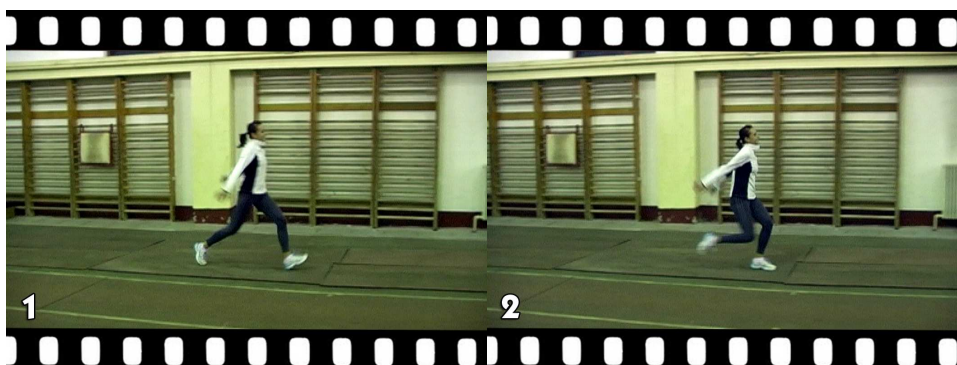


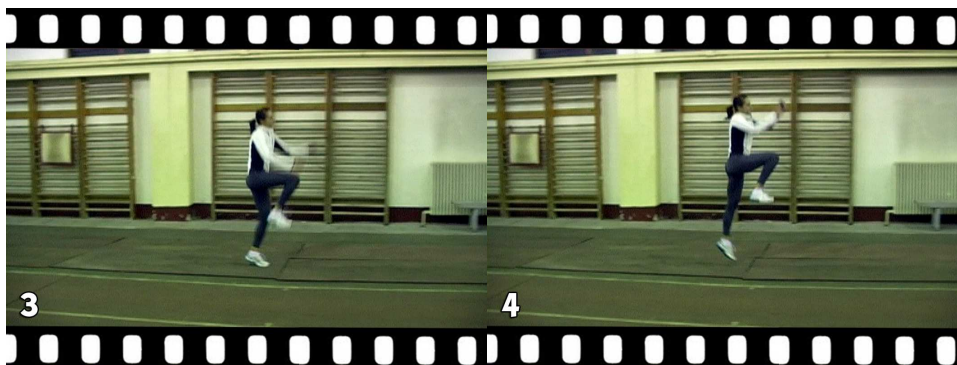
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## 2. Throw (pitch)



## 3. Jump





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