

**PALESTRICA OF THE THIRD MILLENNIUM
CIVILIZATION AND SPORT**

**PALESTRICA MILENIULUI III
CIVILIZAȚIE ȘI SPORT**

A quarterly of multidisciplinary study and research

© Published by The "Iuliu Hațieganu" University of Medicine and Pharmacy of Cluj-Napoca
and
The Romanian Medical Society of Physical Education and Sports
in collaboration with
The Cluj County School Inspectorate

A journal rated B+ by CNCSIS in the period 2007-2011 and
certified by CMR since 2003

A journal with a multidisciplinary approach in the fields of biomedical science,
health, physical exercise, social sciences applied to physical education and sports
activities

A journal indexed in international databases:
EBSCO, Academic Search Complete, USA;
Index Copernicus, Journals Master List, Poland;
DOAJ (Directory of Open Access Journals), Sweden

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Vol. 15, No. 2, April-June 2014

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pISSN 1582-1943

eISSN 2247-7322

ISSN-L 1582-1943

www.pm3.ro

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EDITORIAL

Palestrica of the Third Millennium, important steps for international recognition

Palestrica Mileniului III, pași importanți pentru recunoașterea internațională

Demostene Șofron

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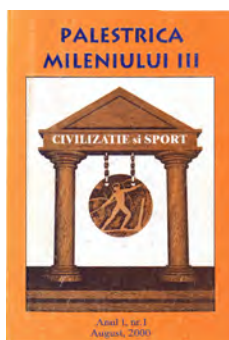
How the time has passed! How many things have happened over the last 15 years! However, one thing is certain, over these last 15 years, the "Palestrica of the Third Millennium – Civilization and Sport" journal has continued to be published with ... admirable *steadfastness*. It has succeeded in overcoming obstacles, particularly financial, and has become a scientific publication with a distinct profile, a publication with a real international recognition potential. This enviable status has been earned thanks to some enthusiasts - Traian Bocu, Simona Tache, Petru Derevenco, Dorin Almășan, Marius Bojiță, Liviu Vlad, Pompiliu Manea, Alexandru Irimie, Ioan Ștefan Florian, and I sincerely regret that all cannot be remembered -, as well as due to the prestigious institution called "Iuliu Hațieganu" *UMPh*.

Like any publication, the *Palestrica of the Third Millennium* journal has diversified its scope and has attracted to its pages nationally recognized signatures (well-known and highly praised names from Cluj-Napoca, Bucharest, Iași, Timișoara, Arad, Craiova, Constanța, Oradea, Tîrgoviște, Brașov), as well as internationally famous authors (specialists from USA, France, Germany, India, Hungary, Denmark, Republic of Moldova, Canada, Portugal, Spain), useful collaborations that are beneficial for a vertical development. Not least, through its content, the *Palestrica of the Third Millennium* proves its theoretical and practical utility by articles with subjects characterized by novelty, inter/multidisciplinarity, being a real guide for specialists and others. It has a distinct profile, in which the most important chapters are the *Editorial*, *Original articles*, *Synthesis articles*, *Current editorial issues*, *Memory of the photographic eye*. An additional value is brought by chapters such as *Case studies*, *Portraits*, *Sports science and sports medicine*, *Physical activity and health in the European*

Union, *Preuniversitaria*, all of which are in a modern, attractive format and are easy to read and, as I mentioned before, they are well anchored in reality by the different topics approached. There are many relevant examples. Each issue of the *Palestrica of the Third Millennium* is a challenge for all the editing staff, highly professional scientific reviewers. Each issue of the *Palestrica of the Third Millennium* is a demonstrated scientific approach, each issue has its own theoretical and practical significance, the use of English and French facilitating the communication between specialists worldwide. Take each separate issue and you will see that these statements are true. Each signature is the guarantee of success in this area, each study is based on hours of extensive research, responsibilities taken and fulfilled at the highest level.

The *Palestrica of the Third Millennium – Civilization and Sport* journal continues to be published and this is what matters most. It is the respect due to ancestors, the respect due to peers, it is the respect due to the Cluj higher medical school, and not least, the respect due to those who wrote and write consistent pages of local, national and international history.

The *Palestrica of the Third Millennium* journal has reached 15 years of age, a beautiful age, let's admit it. It is an anniversary that is related to other two equally important anniversaries, which are relevant for the scientific and editorial life of Cluj in particular, because the 15 years have a history of their own that goes back to very many years ago. The other two anniversaries are 95 years since the first appearance of the highly prestigious *Clujul Medical* journal, and 75 years since the publication of the *Sports Medicine Supplement* by *Clujul Medical*! And the *Palestrica of the Third Millennium* is a dignified follower of the mentioned *Supplement*.



The first journal issue, August 2000



First modernization, June 2004



Current cover and format, 2014

EDITORIAL

Palestrica Mileniului III, pași importanți pentru recunoașterea internațională ***Palestrica of the Third Millennium important steps for international recognition***

Demostene Șofron

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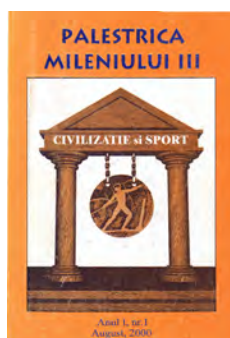
Cum a trecut timpul ! Câte lucruri nu s-au întâmplat în acești 15 ani ? Cert este însă un singur lucru, în acești ultimi 15 ani, *Palestrica Mileniului III - Civilizație și Sport* a continuat să apară cu o ... *încăpățănare* demnă de admirat. A reușit și reușește să depășească obstacole, financiare mai ales, ajungând astăzi o publicație științifică cu un profil distinct, o publicație cu un potențial real de recunoaștere internațională. Și a ajuns la acest statut de invidiat grație unor oameni inimoși - Traian Bocu, Simona Tache, Petru Derevenco, Dorin Almășan, Marius Bojiță, Liviu Vlad, Pompiliu Manea, Alexandru Irimie, Ioan Ștefan Florian, regret sincer că nu pot fi toți amintiți - dar și datorită prestigioasei instituții care este *UMF Iuliu Hațieganu*.

Ca orice publicație, *Palestrica Mileniului III* s-a diversificat tematic, a atras în paginile ei semnături de prestigiu național (nume apreciate și cunoscute din Cluj-Napoca, București, Iași, Timișoara, Arad, Craiova, Constanța, Oradea, Tîrgoviște, Brașov) și internațional (specialiști din Statele Unite, Franța, Germania, India, Ungaria, Danemarca, Republica Moldova, Canada, Portugalia, Spania), colaborări utile și benefice unei dezvoltări pe verticală. Nu în ultimul rând, prin conținut, *Palestrica Mileniului III* își dovedește utilitatea teoretică și practică prin articole cu subiecte în care noul primează, inter/multi/disciplinaritate veritabil ghid pentru specialiști și nu numai. Avem de-a face cu un profil distinct, în care capitolele de rezistență sunt *Editorialul*, *Articolele originale*, *Articolele de sinteză*, *Actualitatea editorială*, *Memoria ochiului fotografic*. Plusul de valoare este dat și de capitole precum *Studii de caz*, *Portrete*, *Știința sportului și medicină sportivă*, *Activitatea fizică și sănătatea în Uniunea Europeană*, *Preuniversitaria*, toate într-un format modern, atrăgător, toate accesibile ca scris și

nu în ultimul rând, reiau această idee, toate bine ancorate în prezent prin temele abordate din mai multe domenii de profil. Exemple sunt multe și relevante. Fiecare număr al *Palestricii Mileniului III* este o provocare pentru întregul corp redacțional, referenți științifici de mare probitate profesională. Fiecare număr al *Palestricii Mileniului III* este un demers științific probat, fiecare număr în parte are însemnătatea lui teoretică și practică, folosirea limbilor engleză și franceză venind în întâmpinarea specialiștilor de pretutindeni. Luați fiecare număr în parte și vă veți convinge de cele afirmate. Fiecare semnătură în parte este garanția succesului în domeniu, fiecare studiu în parte are la bază ore de studiu și cercetare profundă, responsabilități asumate și onorate la înalt nivel.

Palestrica Mileniului III - Civilizație și Sport continuă să apară și acest lucru contează cel mai mult. Este respectul datorat înaintașilor, este respectul datorat celor din zilele noastre, este respectul datorat școlii clujene de învățământ superior medical și, nu în ultimul rând, este respectul datorat celor care au scris și scriu consistente pagini de istorie sportivă locală, națională și internațională.

Palestrica Mileniului III a împlinit 15 ani, o vârstă frumoasă, trebuie să recunoaștem. Este momentul aniversar ce se înscrie, cu cinste, altor două la fel de importante și relevante pentru viața științifică și editorială clujeană în special, pentru că cei 15 ani au o istorie a lor, începută însă cu foarte mulți ani în urmă. Practic este vorba de alte două aniversări, 95 de ani de la apariția publicației științifice de mare prestigiu, *Clujul Medical*, respectiv 75 de ani de la apariția *Suplimentului de Medicină Sportivă* în *Clujul Medical* ! Și *Palestrica Mileniului III* este o demnă continuatoare a *Suplimentului* amintit.



Primul număr al revistei, august 2000



Prima modernizare, iunie 2004



Coperta și formatul actual, 2014

ORIGINAL STUDIES
ARTICOLE ORIGINALE

Motor and emotional behavior in experimentally induced depression Comportamentul motor și emoțional în depresia indusă experimental

Maria G. Puiu¹, Mihnea C. Manea¹, Mirela Manea¹, Simona Tache²

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Abstract

Background. Sleep changes are frequently associated with type 2 diabetes mellitus, obesity and arterial hypertension, and are correlated with major depressive and metabolic disorders.

Aims. We aimed to experimentally study in non-obese and obese female rats the following: depression induced by moderate chronic stress, sleep deprivation, olfactory bulbectomy; the influence of obesity on depression by sleep deprivation; changes in motor and emotional behavior in animals with depression.

Methods. The research was performed in 4 groups (n=10 animals/group), as follows: group I – control group; group II – with depression by sleep deprivation, induced by sound stimuli; group III – female rats with depression induced by olfactory bulbectomy; group IV – female rats with obesity (by administration of 3 ml fat/day by oropharyngeal gavage; the fat lipid content was 93%), and depression by sleep deprivation. Depression by sleep deprivation was induced by exposure for 120 minutes/24 hours (5 minutes/hour, respectively) to a continuous sound stimulus automatically generated by a bell: 5 dB - original model) and using the Kelly method by bilateral olfactory bulbectomy. Involuntary motility was tested using the open field test. The examination moments were: day 1 and day 28. Statistical processing was performed using the Excel application (Microsoft Office 2007) and the StatsDirect v. 2.7.2. program.

Results. The open field test values - emotional score, taking into consideration all groups, evidenced very statistically significant differences between at least two groups, both at moment T_0 ($p=0.0078$) and at moment T_{28} ($p=0.0049$). The open field test values - motility score, taking into consideration all groups, showed highly statistically significant differences between at least two groups, both at moment T_0 and at moment T_{28} ($p<0.0001$).

Conclusions. Emotional behavior decreases after depression induced by sleep deprivation and olfactory bulbectomy, compared to controls. Involuntary motor behavior increases in all groups with depression, compared to initial values.

Key words: depression, Open Field test.

Rezumat

Premize. Modificările de somn sunt asociate frecvent cu diabetul zaharat de tip 2, obezitatea și hipertensiunea arterială și se corelează cu tulburările depresive majore și cu cele metabolice.

Obiective. Ne-am propus să studiem experimental pe animale, șobolani femele, neobeze și obeze: depresia indusă prin stres moderat cronic, prin deprivare de somn, bulbectomie olfactivă; influența obezității asupra depresiei, prin deprivare de somn; modificările comportamentului motor și emoțional la animale cu depresie.

Metode. Cercetările au fost efectuate pe 4 loturi (n=10 animale/lot), după cum urmează: Lot I – martor control; Lot II – cu depresie prin deprivare de somn, indusă prin stimuli sonori; Lot III – femele cu depresie indusă prin bulbectomie olfactivă; Lot IV – femele cu obezitate (prin administrare de 3 ml de untură/zi prin gavaj orofaringian; conținutul lipidic al unturii a fost de 93%) și depresie, prin deprivare de somn. Depresia prin deprivare a fost indusă prin: expunerea timp de 120 minute/24 ore (respectiv 5 minute/oră) la un stimul sonor continuu generat automat de o sonerie: 5 dB - model original) și metoda Kelly, prin bulbectomie olfactivă bilaterală. Testarea motilității involuntare s-a făcut prin Testul Open Field. Momentele pentru examinare au fost: ziua 1 și ziua 28. Prelucrarea statistică s-a efectuat cu aplicația Excel (din pachetul Microsoft Office 2007) și cu programul StatsDirect v.2.7.2.

Rezultate. Testul Open Field - scor emotivitate, luând în considerare toate loturile, au fost observate diferențe statistic foarte semnificative între cel puțin două loturi, atât la momentul T_0 ($p=0,0078$), cât și la momentul T_{28} ($p=0,0049$). Testul Open Field - scor motilitate, luând în considerare toate loturile, au fost observate diferențe statistic intens semnificative între cel puțin două dintre loturi, atât la momentul T_0 , cât și la momentul T_{28} ($p<0,0001$).

Concluzii. Comportamentul emoțional scade după depresia indusă prin deprivare de somn și bulbectomie olfactivă, față de martori. Comportamentul motor involuntar crește la toate loturile cu depresie, față de valorile inițiale.

Cuvinte cheie: depresie, testul Open Field.

Received: 2014, May 12; Accepted for publication: 2014, June 10;

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Introduction

Depression is a multicausal affective disorder, characterized by mood changes, sleep disorders, alterations of daily routine activity, changes in social behavior, appetite changes. Major depressive disorder (MDD) – mono- or unipolar disorder - may take several forms: major depressive disorder with psychotic factors, melancholy, atypical depression, postpartum depression, recurrent depression, treatment resistant depression, seasonal depressive disorder, and depressive disorder with catatonic factors (Prelicpeanu, 2011).

In human pathology, obesity is considered a risk factor in the development of depression (Berk et al., 2013), but at the same time, it can be a comorbidity associated with depression (Kudlow et al., 2013).

Sleep changes (insomnia/hypersomnia) are frequently associated with type 2 diabetes mellitus, obesity and arterial hypertension, and are correlated with major depressive and metabolic disorders (Kudlow et al., 2013).

Objectives

We aimed to experimentally study in non-obese and obese female rats the following:

- a) Depression induced by moderate chronic stress, sleep deprivation, olfactory bulbectomy;
- b) The influence of obesity on depression by sleep deprivation;
- c) Changes in motor and emotional behavior in animals with depression.

Hypothesis

Depression studied over the past fifty years in genetic animal or induced depression models is associated with locomotor, emotional, motor learning and memory changes.

Changes of locomotor and emotional behavior and of motor learning capacity have been studied particularly in animals with depression experimentally induced by bilateral olfactory bulbectomy (Takahashi et al., 2011; Romeas et al., 2009; Gao et al., 2009; Roche et al., 2008; Mchedlidze et al., 2011).

The depression - obesity - sleep disorders association led us to study in obese animals with experimentally induced depression the changes of motor and emotional behavior.

Material and methods

Research protocol

a) Period and place of the research

The research was performed in Wistar female rats aged 4 months, with a mean initial weight of 160 g, from the Biobase of the "Iuliu Hațieganu" University of Medicine and Pharmacy Cluj-Napoca. The study was carried out in the Experimental Research Laboratory of the Department of Physiology, with the approval of the Bioethics Board, in the period 1.10.2013-15.11.2013.

The animals were maintained under adequate *vivarium* conditions: constant temperature (20-23°C); humidity 35-45%; light/dark cycle (12 h light, from 8 a.m. / 12 h dark); standard feeding (combined grain feed, Cantacuzino Institute, Bucharest); water *ad libitum*. All procedures

were in accordance with Directive 86/609/EEC of 24 November 1986, regarding the protection of animals used for experimental and scientific purposes.

Subjects and groups

Groups

The research was performed in 4 groups (n=10 animals/group), as follows:

- group I – control group;
- group II – with depression by sleep deprivation, induced by sound stimuli;
- group III – female rats with depression induced by olfactory bulbectomy (Kelly method);
- group IV – female rats with obesity (by administration of 3 ml fat/day by oropharyngeal gavage; the fat lipid content was 93%), and depression by sleep deprivation.

The mean weight of the animals was 159.4 g for groups I, II and III and 307 g for group IV on day 28.

b) Tests applied

- Depression was induced by exposure for 120 minutes/24 hours (5 minutes/hour, respectively) to a continuous sound stimulus automatically generated by a bell: 5 dB - original model) and using the Kelly method by bilateral olfactory bulbectomy (Kelly et al., 1997).

- Involuntary motility was tested using the open field test (OFT), according to Denenberg & Whimby (1963). The monitored indicators were emotivity and motility. Emotivity was calculated based on the emotional score (ES): the sum of micturitions and defecations expressed in absolute values. The increase of their number is considered an indicator of anxiety. Spontaneous motility was calculated based on the motility score (MS): the sum of crossings and rearings. The increase of motility is and indicator of the absence of anxiety.

The examination moments were: T_1 (day 1) and T_{28} (day 28).

At the end of the experiment, the animals were euthanized with ketamine in a dose of 0.2 ml/100 g animal.

c) Statistical processing

Statistical analysis

Statistical processing was performed using the Excel application (Microsoft Office 2007) and the StatsDirect v.2.7.2. program.

Results

The statistical analysis of the *open field test values - emotional score, taking into consideration all groups*, evidenced very statistically significant differences between at least two groups both at moment T_0 ($p = 0.0078$) and at moment T_{28} ($p = 0.0049$).

The statistical analysis of the *open field test values - motility score, taking into consideration all groups*, showed highly statistically significant differences between at least two groups, both at moment T_0 and at moment T_{28} ($p < 0.0001$).

a) Analysis by moments (Table I)

The statistical analysis of the *open field test values for unpaired samples* revealed the following:

- for the emotional score
 - o at moment T_0 - very statistically significant differences between groups I-II ($p < 0.01$) and statistically significant differences between groups II-IV ($p < 0.05$)

Table I
Comparative analysis for open field test values and statistical significance.

Group	OPEN FIELD test	Mean	SE	Median	SD	Min.	Max.	Statistical significance (p)			
								Unpaired samples			
								Groups I – II	Groups I – III	Groups I – IV	
I	Emotional score	T_0	9.20	0.7424	10	2.3476	5	12	0.0041	0.0505	0.1027
		T_{28}							0.007	0.0264	0.1911
I	Motility score	T_0	20.10	0.6904	20	2.1833	17	23	0.9917	< 0.0001	< 0.0001
		T_{28}							0.0015	< 0.0001	< 0.0001
II	Emotional score	T_0	5.80	0.6110	6.50	1.9322	3	8	0.0502	0.023	0.482
		T_{28}	6.20	0.5538	5.50	1.7512	4	9	0.1581	0.0116	0.028
	Motility score	T_0	20.00	0.6146	19.50	1.9437	17	23	< 0.0001	< 0.0001	< 0.0001
		T_{28}	24.00	0.6325	24.00	2.0000	21	27	< 0.0001	< 0.0001	< 0.0001
									Statistical significance (p)		
									Paired samples (T_1-T_{28})		
								Group I	Group II	Group III	
III	Emotional score	T_0	7.40	0.2211	7.50	0.6992	6	8	—	0.7422	0.4609
		T_{28}	7.00	0.2981	7.00	0.9428	6	9			
III	Motility score	T_0	6.80	0.4163	7.00	1.3166	5	8	—	0.0039	0.1289
		T_{28}	7.60	0.3399	7.00	1.0750	7	10			
								Group IV			
IV	Emotional score	T_0	7.80	0.3590	7.50	1.1353	6	9	0.3750		
		T_{28}	8.20	0.3266	8.50	1.0328	6	9			
IV	Motility score	T_0	11.40	0.4522	11.00	1.4298	10	14	0.002		
		T_{28}	14.60	0.3399	15.00	1.0750	13	16			

o at moment T_{28} - very statistically significant differences between groups I-II ($p < 0.01$) and statistically significant differences between groups I-III, II-IV and III-IV ($p < 0.05$)

- for the motility score

o at moment T_0 - highly statistically significant differences between groups I-III, I-IV, II-III and II-IV ($p < 0.001$)

o at moment T_{28} - very statistically significant differences between groups I-II ($p < 0.01$) and highly statistically significant differences between groups I-III, I-IV, II-III, II-IV and III-IV ($p < 0.001$).

b) Analysis by groups (Table I)

The statistical analysis of the open field test values for paired samples (T_0-T_{28}) evidenced for:

- the emotional score - highly statistically significant differences for group I ($p < 0.001$)

- the motility score - highly statistically significant differences for group I ($p < 0.001$) and very statistically significant differences for groups II and IV ($p < 0.01$).

c) Correlation analysis of scores by groups and moments (Table II)

Table II

Statistical correlation analysis between the open field test scores in the four groups.

Group	Moment	Emotional score – Motility score	
I	T_0	-0.1250	*
	T_{28}	-0.1250	*
II	T_0	0.6050	***
	T_{28}	-0.6669	***
III	T_0	0.4401	**
	T_{28}	-0.2662	**
IV	T_0	-0.1526	*
	T_{28}	-0.4235	**

For group I, the statistical correlation analysis between the values of the studied indicators showed:

- at moment T_0 – a weak/null correlation between the emotional score and the motility score

- at moment T_{28} – a weak/null correlation between the emotional score and the motility score.

For group II, the statistical correlation analysis between the values of the studied indicators showed:

- at moment T_0 – a good positive correlation between the emotional score and the motility score

- at moment T_{28} – a good negative correlation between the emotional score and the motility score.

For group III, the statistical correlation analysis between the values of the studied indicators showed:

- at moment T_0 – an acceptable positive correlation between the emotional score and the motility score

- at moment T_{28} – an acceptable negative correlation between the emotional score and the motility score.

For group IV, the statistical correlation analysis between the values of the studied indicators showed:

- at moment T_0 – a weak/null correlation between the emotional score and the motility score

- at moment T_{28} – an acceptable negative correlation between the emotional score and the motility score.

Discussions

Our research was performed on female rats, given the disease prevalence of 25% for women and 12% for men (Prelipceanu 2011).

Our results for OFT show that depression induced by sleep deprivation (G II) determines at 28 days, compared to controls (G I), significant decreases of ES and significant increases of MS, with a good negative correlation between the scores.

Depression induced by olfactory bulbectomy (G III) determines at 28 days, compared to controls (G I), significant decreases of ES and MS, with an acceptable negative correlation between the scores. Compared to the group in which depression was induced by sleep deprivation (G II), significant decreases of MS were found.

In obese animals, in which depression was induced by sleep deprivation (G IV), at 28 days, there were significant decreases of MS compared to controls (G I), significant increases of ES and significant decreases of MS compared

to non-obese animals with depression induced by sleep deprivation (G II), and significant increases of ES and MS compared to animals with depression induced by olfactory bulbectomy (G III). In group IV, there was an acceptable negative correlation between ES and MS.

Compared to initial values (moment T_0), at 28 days (moment T_{28}), there were significant increases of ES in G II and G IV and significant decreases of ES in G III. The motility score increased significantly at 28 days in groups II and IV, with the highest increases in G II.

The comparative analysis of the two induced depression models (G II and G III) only showed changes in MS, which significantly decreased in G III, at moments T_0 and T_{28} .

Obesity in animals with depression (G IV), compared to controls (G II), caused changes in ES, which significantly increased at moments T_0 and T_{28} , and in MS, which significantly decreased at moments T_0 and T_{28} .

Our data showed a diminution of locomotor activity: involuntary motility and exploratory behavior in animals with depression induced by olfactory bulbectomy, compared to animals with depression by sleep deprivation. In obese animals with experimentally induced depression, there was a diminution of locomotor activity: involuntary motility and exploratory behavior compared to non-obese depressive control animals.

Our results are in accordance with the data of other authors regarding the decrease of locomotor and exploratory behavior and the increase of immobility in animals with induced depression (Che et al., 2013; Tasset et al., 2010; Husain et al., 2011; Shaw et al., 2009; Wang et al., 2009; Romeas et al., 2009).

Moderate chronic stress by sound stimuli, used by us for inducing depression, is a valid model that supports its association with depression, as a form of stress by overstraining, which elicits characteristic locomotor and emotional behavioral responses (Derevenco et al., 1992; Riga & Riga 2008; Preliceanu, 2011).

Physical exercise has favorable anti-depressive effects on locomotor activity in depression (Bruja, 2014; Che et al., 2013; Hendriksen et al., 2012; Shaw et al., 2009; Wang et al., 2009; Romeas et al., 2009; Roche et al., 2008) and is recommended as a form of therapy in depression.

Conclusions

1. Emotional behavior decreases after depression induced by sleep deprivation and olfactory bulbectomy, compared to controls.

2. Involuntary motor behavior increases after depression induced by sleep deprivation and decreases after depression induced by olfactory bulbectomy and in obese animals with depression induced by sleep deprivation, compared to controls.

3. Involuntary motor behavior increases in all groups with depression, compared to initial values.

Conflicts of interests

There are no conflicts of interest.

Acknowledgments

This paper is based on preliminary research data for the first author's doctoral thesis.

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The assessment of the physical activity of Romanian university students in relation to nutritional status and academic performance

Estimarea activității fizice la un lot de studenți din România în relație cu starea de nutriție și performanța universitară

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Abstract

Background. Regular physical activity may help improve the students' academic performance, including academic achievement and grades, academic behavior such as time on task, factors that influence academic achievement such as concentration and attentiveness in the classrooms. Long term benefits of physical activity help to reduce the incidence of overweight and obesity and chronic disease such as diabetes, cardiovascular disease and cancer. Also, regular physical activity may reduce anxiety and depression and promote positive mental health.

Aims. To estimate the physical activity level among students and to correlate it with academic performance, such as grades in the previous semester and hours of individual study, and the body mass index.

Methods. The study was a cross-sectional survey analysis of 315 university medical students. Physical activity was assessed using the International Physical Activity Questionnaire, the short self-administered form. Academic performance was estimated using additional questions, such as hours of individual study and average grades in the previous semester. Nutritional status was assessed by computing the body mass index. Descriptive statistical tests and multivariate analyses (Games-Howell test, Pearson correlation) using SPSS version 20 were performed.

Results. Males performed more physical activity than females ($p=0.002$). Physical activity was correlated with the body mass index and body weight ($p=0.02$). The results of the study showed the correlation between total physical activity and the grades in the previous semester.

Conclusion. The findings of this study underline the need to increase the level of physical activity among students in order to promote a healthy lifestyle and to improve academic performance. Secondly, the study highlights problems of public health; medical students could have a higher level of physical activity than the general population, being more informed.

Key words: physical activity, students, academic performance, nutritional status.

Rezumat

Premize. Activitatea fizică regulată poate augmenta performanța academică a studenților, prin îmbunătățirea rezultatelor obținute, a creșterii randamentului școlar, a puterii de concentrare și a atenției în timpul orelor. Beneficiile pe termen lung ale activității fizice regulate sunt de a preveni incidența supraponderiei și obezității, și a bolilor cronice, ca și diabetul, bolile cardiovasculare și unele localizări ale cancerelor. De asemenea, efortul fizic regulat poate reduce anxietatea și depresia și promovează o sănătate mintală pozitivă.

Obiective. Scopul studiului este de a estima nivelul activității fizice la un lot de studenți și de a o corela cu performanța academică, precum și cu statusul nutrițional al studenților.

Metode. S-a efectuat un studiu transversal pe un lot de 315 studenți medici. Nivelul activității fizice s-a estimat cu ajutorul unui chestionar validat, autoadministrat. Performanța academică s-a evaluat pe baza unor întrebări adiționale incluse în chestionar: ore studiu individual pe săptămână și media notelor obținute în semestrul anterior. Statusul nutrițional a fost apreciat prin calcularea indicelui de masă corporală. Datele au fost analizate în programul SPSS 20. S-a folosit testul Games-Howell pentru analiza multivariată și coeficientul de corelație Pearson.

Rezultate. Băieții au efectuat semnificativ mai mult efort fizic decât fetele ($p=0.002$). Nivelul activității fizice s-a corelat cu indicele de masă corporală și greutatea studenților ($p=0,02$). Studiul a evidențiat corelația dintre activitatea fizică totală și media semestrului anterior.

Concluzii. Rezultatele studiului de față subliniază necesitatea creșterii nivelului activității fizice la studenți pentru promovarea stării de sănătate și îmbunătățirea performanțelor școlare. Totodată, studiul nostru ridică probleme de sănătate publică referitoare la activitatea fizică efectuată de populație, studenții medici fiind mai informați despre stilul de viață sănătos ar putea presta mai mult efort fizic decât populația generală.

Cuvinte cheie: activitate fizică, studenți, performanța academică, status nutrițional.

Received: 2014, April 2; Accepted for publication: 2014, April 30;

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Introduction

Regular physical activity may help improve the students' academic performance, including academic achievement and grades, academic behavior such as time on task, factors that influence academic achievement such as concentration and attentiveness in the classrooms. Long term benefits of physical activity help to reduce the incidence of overweight and obesity and chronic disease such as diabetes, cardiovascular disease and cancer (***, 2014). These diseases have been strongly associated with unhealthy lifestyle habits such as inappropriate nutrition, lack of exercise, smoking, alcohol consumption, caffeine overuse and improper sleeping habits. Healthy active living benefits both individuals and society in many ways, by increasing productivity, improving morale, decreasing absenteeism, and reducing health care costs. Other benefits include improved psychological well-being, physical capacity, self-esteem and the ability to cope with stress. Also, regular physical activity may reduce anxiety and depression and promote positive mental health (***, 2014). University life is also a period during which individuals are mostly exposed to stress and lack of time, which poses a barrier to the adoption of healthy practices (Kim et al., 2005). Physical activity among students is consistently related to higher levels of self-esteem and self-concept and lower levels of anxiety and stress. Although student behaviors are considered a temporary part of university life, the unhealthy habits picked up during this time period generally persist in adult life. Among this student population, it is assumed that medical students have a greater knowledge about a healthy lifestyle and dietary habits when compared to other students.

Healthy habits among medical students are even more important as they are future physicians and students who personally ignore adopting a healthy lifestyle are more likely to fail to establish health promotion opportunities for their patients (Rao et al., 2012).

According to the World Health Organization, the recommended levels of physical activities for adults aged between 18-64 are: at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity. Aerobic activity should be performed in bouts of at least 10 minutes duration. For additional health benefits, adults should increase their moderate-intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate- and vigorous-intensity activity. Muscle-strengthening activities involving major muscle groups should be performed on 2 or more days a week (***, 2009). Participation in physical activity declines as young people age. Personal, social, and environmental factors all play a role in determining physical activity levels among youths. Physical activity researchers have identified some of the principal factors found to be positively associated with physical activity among youths, which include parental education, male gender, participation in physical education classes and school sports, belief in the ability to be active (self-

efficacy), personal goals, enjoyment of physical activity, support of friends and family, and supportive environments (e.g., presence of sidewalks, access to neighborhood or school play areas, and access to recreational equipment) (Lowry et al., 2013).

Objectives

To estimate the physical activity level among students and to correlate it with academic performance, such as grades in the previous semester and hours of individual study, and the body mass index.

Hypothesis

Both physical activity and the body mass index have been shown to impact academic performance in students, but data for university students are limited.

Material and methods

Research protocol

We mention that according to the Helsinki Declaration, the Amsterdam Protocol and Directive 86/609/EEC, the approval of the Ethical Commission of "Iuliu Hațieganu" University of Medicine and Pharmacy Cluj-Napoca was obtained. The informed consent of the participants in this research was given.

a) *Period and place of research.*

A cross-sectional survey analysis was conducted on 315 university medical students from the "Iuliu Hațieganu" University of Medicine and Pharmacy Cluj-Napoca. Data were collected during the second semester (February- May 2013) of the academic year 2012-2013.

b) *Subjects and groups.*

The sample consisted of 103 male students and 212 female students. 45.72% were first year students and 54.28% were third year students. The mean age of the subjects in the selected group was 20.76 ± 1.91 years. Participation in the study was voluntary and anonymous. All students agreed to participate in this study.

c) *Tests applied*

Physical activity was assessed using the International Physical Activity Questionnaire, the short self-administered form (Craig et al., 2013). The questionnaires were administered during the classes to encourage participation. This questionnaire estimates the time spent being physically active in the last 7 days. The questions assess the duration ("how much time did you usually spend...") and frequency ("how many days/week") of vigorous, moderate physical activities and walking. Vigorous physical activity refers to activities that require heavy physical effort and make someone breathe much harder than normal. Moderate physical activities refer to activities that make someone breathe somewhat harder than normal. Academic performance was estimated using additional questions, such as hours of individual study and average grades in the previous semester. Self-reported height and weight were also included in the questionnaire. Nutritional status was assessed by computing the body mass index (or the Quetelet index) using the formula $\text{weight}/\text{height}^2$ (kg/m^2). We divided the study group in four categories depending on the body mass index: underweight with $\text{BMI} < 18.5$; normal weight with $\text{BMI} = 18.5-24.9$; overweight with $\text{BMI} = 25-29.9$ and obese with $\text{BMI} > 30$.

d) *Statistical processing*

Descriptive statistical tests and multivariate analyses (Games-Howell test, Pearson correlation) using SPSS version 20 were performed.

The results were statistically significant at $p < 0.05$.

Results

The results of the study showed that 57.8% of the students were engaged in vigorous physical activity and 50.2% in moderate physical activity. For all students, walking was the main physical activity performed (Table I).

Table I
Type of physical activity and prevalence among students.

Type of physical activity	Total number (percent)	Males (number, percent)	Females (number, percent)
Vigorous	182 (57.8%)	73 (70.87%)	111 (52.35%)
Moderate	158 (50.2%)	61 (70.87%)	99 (46.69%)
Walking	302 (95.9%)	94 (91.26%)	207(97.64%)

Table II
Studied variables depending on gender.

Studied variables	Males	Females
	(mean ± standard deviation)	(mean ± standard deviation)
Grade point average in the previous semester ¹	8.13 ± 0.95	8.88 ± 7.47
Hours of individual study/ week ²	19.51± 13. 04	22.99 ± 12.35
Vigorous physical activity min/ day ³	36.10 ± 28.38	30.48 ± 23.16
Moderate physical activity min/day ⁴	34.80 ± 29.97	31.21 ± 37.61
Walking min/day ⁵	84.08 ± 70.69	72.58 ± 50.79
Total physical activity min/day ⁶	123.42 ± 90.83	100.97± 69.46

¹ $p > 0.05$; ² $p = 0.02$; ³ $p > 0.05$; ⁴Anova $F = 22.46$ $p < 0.001$;

⁵Anova $F = 4.78$ $p = 0.003$; ⁶Anova $F = 5.11$ $p = 0.002$

Male students had a higher level of physical activity than female students. They were involved for a longer time in all physical activities. Female students spent more time studying than male students and had better grades in the previous semester than male students (Table II).

The results of the study showed that the mean value of the body mass index for both girls and boys was within the normal weight category (Table III).

Table III
Assessment of nutritional status.

Variable	Males (mean ± standard deviation)	Females (mean ± standard deviation)	p value
Weight (kg)	71.17 ± 14.25	58.80 ± 9.64	<0.001
Height (cm)	176.62 ± 9.63	168.05± 6.82	<0.001
Body mass index (kg/m ²)	22.66 ± 3.06	20.74 ± 2.51	<0.001

The majority of the students (74.8%) had a normal BMI. More male students were overweight than female students, but more girls (17.5%) were included in the underweight category than boys (Chi-square=23.099, $p < 0.001$). Only a small percent (1.5%) of these students were obese (Table IV).

Table IV
Categories of body mass index in the studied groups.

Body mass index	Total (number, %)	Males (number, %)	Females (number, %)
Underweight <18.5	43 (13.7%)	6 (5.9%)	37 (17.5%)
Normal weight 18.5-24.9	234 (74.8%)	73 (71.6%)	161(76.3%)
Overweight 25-29.9	31 (9.9%)	20 (19.6%)	11 (5.2%)
Obesity >30	5 (1.6%)	3 (2.9%)	2 (0.9%)

The results showed the presence of a correlation between the total level of physical activity and the body mass index. On the other hand, the average grades in the previous semester were correlated with the amount of physical activity. The body mass index was positively correlated with the grades in the previous semester (Table V).

We calculated the level of physical activity depending on the categories of BMI. Apparently, obese students performed more effort than other students. On the other hand, normal weight students were more physically active than overweight and underweight participants (Table VI).

Table V
Correlation between physical activity, academic performance and the body mass index.

Variable	Vigorous physical activity	Moderate physical activity	Walking	Total physical activity	Body mass index	Hours of individual study/week	Grade point average
Vigorous physical activity	1						
Moderate physical activity	.153	1					
Walking	-.046	.240**	1				
Total physical activity	.356**	.625**	.823**	1			
Body mass index	-.046	-.616**	.103	-.284**	1		
Hours of individual study/week	-.107	.001	.007	.008**	.031	1	
Grade point average	.022	-.027	-.054**	.023**	.015**	-.034	1

Table VI
Levels of physical activity depending on nutritional status.

BMI (kg/m ²)	Vigorous physical activity (min/day)	Moderate physical activity (min/day)	Walking (min/day)	Total physical activity (min/day)
Underweight BMI<18.5	29.50 ± 24.43	23.26 ± 23.12	76.16 ± 45.77	104.38 ± 53.26
Normal weight BMI=18.5-24.9	33.26 ± 25.74	32.25 ± 27.88	78.07 ± 60.74	110.26 ± 78.56
Overweight BMI=25-29.9	34.03 ± 27.58	26.21 ± 20.03	54.75 ± 35.26	84.26 ± 44.88
Obese BMI>30	28.57 ± 19.79	168.57 ± 113.82	180 ± 60	226.28 ± 209.39

Discussion

Physical inactivity is the fourth leading risk factor for global mortality (5.5%), after high blood pressure (12.8%), tobacco use (8.7%), high blood glucose (5.8%) (***, 2014). The long-term consequences of physical inactivity and a poor diet, overweight and obesity can increase one's risk for diabetes, high blood pressure, high cholesterol, asthma, arthritis, and poor health status. Increasing levels of physical inactivity are seen worldwide, in high-income countries as well as in low- and middle-income countries. In addition to this, different studies have demonstrated that, in general, the engagement in physical activities in the spare time decreases as we get older, and that women devote less time to the practice of moderate and vigorous physical activities (Irwin, 2007). Urban and environmental policies can have huge potential to increase physical activity levels in the population. It is well known that the practice of physical exercise can have important benefits in terms of preventive and therapeutic effects on health (Norwood et al., 2013). A number of studies conducted to evaluate the physical activity, diet, and fitness status of university students have revealed that the physical condition and nutritional habits of students are very much associated with their own attitudes toward health promotion and illness prevention (Haase et al., 2004). Positive attitudes in these regards are vital for our future health professionals.

A positive finding revealed by our study was that nearly 75% of the medical students had a normal BMI. The results of the study show that students met the WHO recommendations regarding physical activity guidelines for health. Normal weight students had a higher level of physical exercise than overweight students and this result highlights the importance of effort in preventing weight gain. Like other studies, the present study showed that males were more physically active than females (Nițescu et al., 2013). Only 50% of the girls performed moderate and vigorous physical activity. Both male and female students were engaged in over an hour of walking daily. It is possible that in the general population, the general level of physical activity might be lower; medical students, being more informed about the benefits of regular physical activity in conjunction with a healthy lifestyle, could have a better attitude regarding this practice. Even in adolescence (Kim et al., 2005) and during the transition period to university, and more specifically during the university study period, there is a rise in the disregard of a healthy lifestyle and a decrease in the practice of moderate to vigorous physical activity. This becomes a critical moment for the promotion of physical activity, mainly among women (Vilhjalmsson & Kristjansdottir, 2003), who start to reduce their level of physical-sport practice from 11/12 years old. It is important that the necessary steps are taken in order to deal with this problem. Research has revealed many influential determinants of physical activity, with specific attitudes and beliefs being associated with a lack of physical activity. Several studies have concluded that "not having enough time" is the most important barrier for not participating in physical activity (Gómez-López et al., 2010).

Research suggests that physical activity may increase the students' cognitive control - or ability to pay attention

- and also results in better performance on academic achievement tests (Shepard, 1997; Dwyer et al., 2001). A lot of studies suggest a positive correlation between physical activity and the academic performance of students (Booth et al., 2013).

This link could be caused by many factors: increased blood and oxygen flow to the brain, boosts in hormones such as norepinephrine and endorphins which help improve mood, and increased growth factors that help create new nerve cells and support synaptic plasticity. The present study found a positive correlation between total physical activity and grades in the previous semester. Grades in the previous semester were positively correlated with the body mass index.

One major limitation of this study was the small sample size, diminishing the power to detect differences among groups. Secondly, as with any cross-sectional study, the reported values may be a snapshot and not represent the full experience of this population. Caution should be taken when interpreting our findings, since it is well established that individuals tend to over-report their height and under-report their weight, causing misclassification of BMI status. Additionally, individuals tend to over-report their physical activity (Franz & Feresu, 2013). This tendency is most prevalent in overweight persons, and this could have affected our results.

The study supports public health policies to increase physical activity in communities. Tobacco use, together with physical inactivity, unhealthy dietary habits and an excessive energy intake are the most modifiable risks factors for non-communicable diseases.

Conclusions

1. Male students performed higher levels of physical activity than female students.
2. The study highlights the importance of physical activity in improving academic performance among medical university students.
3. The results show that adopting a healthy lifestyle, which includes physical activity, can prevent overweight and obesity among university medical students that spend a lot of time studying.
4. It is possible that medical students had a better attitude and practice of physical activity than general population students, being more informed about the benefits of regular exercise in improving good health.

Conflicts of interests

There are no conflicts of interests.

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Relationship between plant supplements and sports - from the perspective of PubMed publications

Relația dintre suplimentele din plante și sport - din perspectiva publicațiilor PubMed

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Abstract

Background. Plant supplements (PS) are more and more often used in sport (S), as well as in the profile research area.

Aims. The aim was the evaluation of the PS+S relationship, through the analysis of PubMed publications over the last 28 years.

Methods. The PS+S relationship over the period 1985-2013, in which, until March 2014, there were publications with this combination of keywords, was analyzed; two criteria of analysis were used: a) the criterion of time - average per year for the periods 1985-1989, 1999-1999, 2000-2009, and the number of publications per year for the years 2010, 2011, 2012, 2013; b) the criterion of PubMed filters, evaluating three PubMed filters - Text availability, Species and Sex - each of them with the corresponding subfilters.

Results. There are differences: a) between averages over 28 years: for the total number of publications (N), abstracts (A) and full-text (FT), compared with free full-text (FFT), over all analyzed periods of time; b) between publications with human subjects (H) and those with animals (An); c) between studies on males (M), females (F) and both genders (MF).

Conclusions. 1) The total number of publications over 28 years is important, 172. 2) The number of publications with FFT was reduced compared to N, A and FT. 3) Studies with H prevailed, compared to An, and the predominantly analyzed gender was M. 4) Given the growing number of publications on the relationship between herbal supplements and sport, we can deduce their importance in sports activity.

Key words: plant supplements, sports, PubMed filters.

Rezumat

Premize. Suplimentele din plante (SP) sunt tot mai frecvent utilizate în sport (S), precum și în cercetarea de profil.

Obiective. Scopul a fost evaluarea a relației SP+S, prin analiza retrospectivă a publicațiilor PubMed din ultimii de 28 de ani.

Metodă. Relația SP+S a fost analizată pentru perioada 1985-2013, în care există, până în Martie 2014, publicații cu această combinație de cuvinte cheie, fiind folosite două criterii de analiză: a) criteriul timp - media per an, pentru perioadele 1985-1989, 1999-1999, 2000-2009 și numărul de publicații per an, pentru anii 2010, 2011, 2012, 2013; b) Criteriul filtrelor PubMed, evaluând trei filtre PubMed - Disponibilitatea de text, Specie și Gen - fiecare dintre acestea, cu subfiltrele corespunzătoare.

Rezultate. Există diferențe: a) între mediile pe 28 ani: pentru numărul total de publicații (N) pentru 1985-2013, respectiv de abstracte (A) și de text integral (FT), comparativ cu cel cu text integral gratuit (FFT), pentru toate perioadele de timp analizate; b) între publicațiile cu subiecți umani (H) și cele cu animale (An); c) între studiile care au folosit subiecți bărbați (M), femeii (F) sau ambele genuri (MF).

Concluzii. 1) Numărul total de publicații pe 28 de ani este important, 172. 2) Numărul de publicații cu FFT, este redus comparativ cu N, A și FT. 3) Studiile cu H au prevalat, comparativ cu cele pe An, iar genul analizat predominant a fost M. 4) Dat fiind numărul în creștere al publicațiilor referitoare la relația dintre suplimentele din plante și sport, se poate deduce importanța acestora în activitatea sportivă.

Cuvinte cheie: suplimente din plante, sport, filtre PubMed.

Received: 2014, May 5; *Accepted for publication:* 2014, May 30;

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Introduction

Plant supplements (PS) are more and more often used in sport (S), as well as in the profile research area. We quote, in this respect, a few recent PubMed publications, in chronological order:

“Dietary nitrate supplementation reduced resting blood pressure and improved kinetics during treadmill walking in healthy older adults but did not improve walking or cognitive performance” (Kelly et al., 2013a).

“Biostimine supplementation reduces the postexercise level of the concentration of thiobarbituric acid reactive substances by increasing the antioxidant activity of plasma but has no effect on inflammatory markers” (Basta et al., 2013).

“Dietary NO₃⁻ supplementation improves performance during intense intermittent exercise and may be a useful ergogenic aid for team sports players” (Wylie et al., 2013b).

“Dietary nitrate supplementation improved endurance during severe-intensity exercise in recreationally active subjects” (Kelly et al., 2013b).

“Both fruit, berry and vegetable juice powder supplementation and a single walking bout improved the markers of the microcirculation in these obese women” (Lamprecht et al., 2013).

“The use of beetroot juice enhances cardiovascular health and exercise performance in young adults” (Wylie et al., 2013a).

“Dietary supplementation with NO₃⁻-rich BR juice speeds VO₂ kinetics and enhances exercise tolerance during severe-intensity exercise when initiated from an elevated metabolic rate” (Breese et al., 2013).

The present article is the continuation of previous research of the authors concerning the assessment of the relationship between physical effort and various plant extracts through both personal studies (Jurcău et al., 2012, 2013; Jurcău & Jurcău, 2013) and analysis of PubMed publications (Jurcău, 2012).

Objectives

The aim of the present research is the evaluation of research activities for the relationship between herbal supplements and sport, through the use of the PubMed web site.

Hypothesis

Herbal supplements are a family of products increasingly used in sports, and research in this direction is on the rise.

Material and methods

The study analyzed the „plant supplements AND sport” (PS+S) relationship over 28 years, the 1985-2013 time period, between the first and last publication corresponding to this keyword combinations, and had the following elements of analysis:

a) the average number of publications per annum, for decades: 1980-89, 1990-99, 2000-2009; and the number of publications per year for the years 2010, 2011, 2012 and 2013;

b) the percentage (%) of subfilters for the analyzed keyword combinations in relation to the total number of

publications, for the whole 1985-2013 period, but also for the decades and years taken into consideration.

c) some filters to check information provided by the PubMed site, namely: Text availability, Species, Sex, each of these filters forming a study group.

Within each selected check filter, some subfilters were analyzed, and for each of them, the number of publications per year was calculated, using the mentioned keywords.

1. For the *Text availability* group filter, the chosen subfilters were: the total number of publications (N), the abstract number (A), the number of publications with full text (FT) and free full text (FFT).

2. For the *Species* group filter, the chosen subfilters were: other animals (An) and humans (H).

3. For the *Sex* group filter, the chosen subfilters were: Male (M), Female (F), Male and Female (MF).

Statistical evaluation

The results obtained were analyzed using the SPSS 13.0. statistical package. For continuous data examination, Student’s t test was used. The differences were considered significant at a p< 0.05.

Results

The data collection took place in May 2014. For all groups, data distribution was normal, according to the Kolmogorov-Smirnov test. The analysis was made on the chosen time periods.

a) Analysis of the *Text availability* filter (Tables I and II)

The total number of publications over 28 years was 172 (N), followed in terms of value by FT (159), representing 92.4% of N, then by A (156), 90.6%. FFT represented only 20.4% of N.

The analysis of the percentage (%) of subfilters in relation to N shows that the highest percentage was recorded: in 2010 for FT (100%) and FFT (21%), and in 2013 for A (100%). The lowest percentage was recorded in 2012 for FFT (13%).

Table I
Percentages of subfilters in relation to N *Text availability* filter.

Time period	N	A	FT	FFT
1985-2013	100	90.6	92.4	20.4
1985-2009	100	91	89	17
2010	100	89.4	100	21
2011	100	88	96.8	30
2012	100	91.3	95.6	13
2013	100	100	95	30

Table II
Analysis of the number of publications, with the *Text availability* filter, in relation to FFT.

Time period	N	A	FT	FFT
1985-2013	172	156	159	35
1985-1989	0.2	0.1	0.1	0
1990-1999	0.2	0.2	0.1	0
2000-2009	8.6	7.9	7.8	1.5
2010	19	17	19	4
2011	31	27	30	9
2012	23	21	22	3
2013	20	20	19	6
Mean	14.5714	13.3142	14	3.3571
Standard deviation	10.9463	9.8602	10.656	3.0556
P-value	0.016	0.017	0.018	

Significant differences were noted for the averages over 28 years between N and FFT (p = 0.016), A and FFT (p = 0.017), FT and FFT (p = 0.018). During the period

1985-1999, no publication had FFT. The dynamic analysis of the number of publications over 28 years shows that N, A, FT and FFT began to grow from the period 2000-2009 to 2010, reached the highest value in 2011, and slightly decreased over the past two years.

b) Analysis of the *Species* filter (Tables III and IV)

The total number of publications over 28 years in which the H subfilter was mentioned was 150, representing 88% of N.

The analysis of the percentage (%) of subfilters in relation to N shows that the highest percentage was recorded: in 2012 for An (30.4%) and in 2010 for H (94.6%). The lowest percentage was recorded in 2010 for An (5.3%).

Table III

Percentages of subfilters in relation to N, *Species* filter.

Time period	N	An	H
1985-2013	100	53.3	88
1985-2009	100	15.6	88.9
2010	100	5.3	94.6
2011	100	22.6	93.5
2012	100	30.4	72.9
2013	100	20	70

There were no studies with An in the period 1985-1999. The largest number of publications with An was in 2011 and 2012 (7), and with H in 2011 (29). Only the difference between N and the number of publications with An was significant (0.013).

Table IV

Analysis of the number of publications with the *Species* filter, in relation to N.

Time period	N	An	H
1985-2013	172	31	150
1985-1989	0.2	0	0.2
1990-1999	0.2	0	0.2
2000-2009	8.6	1.4	7.6
2010	19	1	18
2011	31	7	29
2012	23	7	17
2013	20	4	14
Mean	14.5714	2.9142	12.2857
Standard deviation	10.9463	2.8662	9.6456
P-value		0.013	ns

c) Analysis of the *Sex* filter (Tables V and VI)

The highest number of publications over 28 years was found for both filters, M and F (112), which represents 59.8% of N, followed in terms of value by M (102), 52.8% of N, and by F (46), 33.9% of N.

Table V

Percentages of subfilters in relation to N, *Sex* filter.

Time period	N	M	F	MF
1985-2013	100	59.3	26.8	65.1
1985-2009	100	62	28	66
2010	100	63.1	31.6	78.9
2011	100	71	29.1	78
2012	100	48	21.8	56.6
2013	100	50	20	55

The analysis of the percentage (%) of subfilters in relation to N demonstrates that the highest percentage was recorded: in 2011 for M (71%), and in 2010 for F (31.6%) and for MF (78.9%). The lowest percentage was found in 2013 for F (20%).

The number of publications with M was higher than that with F, for the entire period of time. During all analyzed years, studies with both M and F were performed. The differences were significant only between N and F (p = 0.019).

Table VI

Analysis of the number of publications, with the *Sex* filter, in relation to N.

Time period	N	M	F	MF
1985-2013	172	102	46	112
1985-1989	0.2	0.1	0.1	0.1
1990-1999	0.2	0.1	0.1	0.1
2000-2009	8.6	5.3	2.3	5.7
2010	19	12	6	15
2011	31	22	9	24
2012	23	11	5	13
2013	20	10	4	11
Mean	14.5714	8.6428	3.7857	9.8428
Standard deviation	10.9463	7.1135	2.998	7.9761
P-value		ns	0.019	ns

Discussion

The dynamic evolution of N, A, FT and FFT shows that between 1985-2013, so for a period of 28 years, the number of studies including these subfilters for the keywords „plant supplements AND sport” (PS+S) was important (N=172). There was no FFT recorded between 1985-1999. The interest in these subfilters began to grow in the period 2000-2009. The average number of N publications per year was the highest in 2011 (31). Of these publications, the number of FFT was constantly lower, compared to N, A and FT. Thus, the difficulty of access to full text information can be noted for these publications without FFT.

The dynamic evolution of H shows that between 1985-2013, so for a period of 28 years, the number of studies including these subfilters for the keywords „plant supplements AND sport” (PS+S) was important (150). Although animal studies related to the combination of the chosen words were also present permanently, their number was always lower compared to those with human subjects. During the 1985-1999 period, there were no studies with animals. The interest in these subfilters began to grow in the period 2000-2009, the average number of publications with H per year being the highest in 2011 (29).

In 2013, there were 4 publications with An (Campbell et al., 2013; Mahmoody et al., 2013; Malardé et al., 2013; Xu et al., 2013) and 14 with H (Basta et al., 2013; Derosa G et al., 2013; Gleeson, 2013; Gleeson, Williams, 2013; Kaats et al., 2013; Kelly et al., 2013; Kelly et al., 2013; Knab et al., 2013; Koncic, Tomczyk, 2013; Lamprecht et al., 2013; Malardé et al., 2013; Wylie et al., 2013; Wylie et al., 2013; Xu et al., 2013).

The dynamic evolution of M, F and MF shows that between 1985-2013, so for a period of 28 years, the number of studies including these subfilters for the keywords „plant supplements AND sport” (PS+S) was important (112 for MF). The interest in these subfilters began to grow in the period 2000-2009, the average number of publications per year being the highest in 2011 for all subfilters, M (22), F (9) and MF (24). MF values were permanently higher compared to M and F. Although there were studies for both genders with respect to the combination of the chosen

words, the number of studies with M was always greater compared to those with F. It is a fact that, in the case of the „plant supplements AND sport” keywords, studies having both M and F subjects were preferred.

In 2013, there were 10 publications with M (Basta et al., 2013; Breese et al., 2013; Derosa et al., 2013; Kelly et al., 2013; Kelly et al., 2013; Knab et al., 2013; Malardé et al., 2013; Wylie et al., 2013; Wylie et al., 2013; Xu et al., 2013), 4 with F (Derosa et al., 2013; Kelly et al., 2013; Lamprecht et al., 2013; Wylie et al., 2013) and 11 with MF (Basta et al., 2013; Breese et al., 2013; Derosa et al., 2013; Kelly et al., 2013; Kelly et al., 2013; Knab et al., 2013; Lamprecht et al., 2013; Malardé et al., 2013; Wylie et al., 2013; Wylie et al., 2013; Xu et al., 2013).

The evaluation of the relationship between herbal supplements and sport demonstrates, by the growing number of publications, the interest in this subject, which although began to be studied relatively recently, starting with 1985, represents a cross-domain issue.

Conclusions

1. The total number of publications over 28 years is important, 172.
2. The number of FFT publications was low compared to N, A and FT publications.
3. Studies with H prevailed, compared to An, and the predominantly analyzed gender was M.
4. Given the growing number of publications on the relationship between herbal supplements and sport, we can deduce their importance in sports activity.

Conflicts of interest

Nothing to declare.

Acknowledgement

We address our thanks to Mr. Nicolae Colceriu, Eng. Ph.D, at USAMV Cluj-Napoca, for the statistical processing of the results.

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Joint mobility limitations and fundamental motor skills in adolescents participating in a weight training program **Limitările mobilității articulare și deprinderile motrice de bază la adolescenții supuși unui program de forță**

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Abstract

Background. Fundamental Motor Skills have been developed as an integral part of the Health and Physical Education Curriculum Planning and Course Support materials documentation. Fundamental motor skills, such as overhand throw, underpin the learning of more complicated sport and movement skills common to the community. It is generally believed that the range of motion (ROM) has a significant role in the performance of movements.

Aims. The present study aims at observing the role of weight training exercise on decreasing the ROM and its relation with kinematical aspects of the movement pattern performance.

Methods. To do so, the performance of overhead throwing was compared between weight training participants (WT) and non-weight training participants (NW).

Results. The analysis of the data showed that the ROM of internal and external rotation of the shoulder was lower in WT than in NW subjects ($P < 0.05$). There were also significant differences in the angular displacement of the shoulder ($P = 0.049$) and elbow ($P = 0.045$) between the two groups of subjects. Furthermore, the movement pattern of the WTs was not consistent with the open kinetic chain principle.

Conclusions. The results show that the performance of WTs in the overhead throwing pattern was less efficient in comparison with that of NWs. So, it can be concluded that weight training has a negative effect on one of the fundamental motor skill performances due to the decrease in joint mobility.

Key words: flexibility, performance, weight lifting, hypertrophy.

Rezumat

Premize. Deprinderile motorii de bază au fost dezvoltate ca parte integrantă din materialele documentare suport pentru cursul intitulat Planificarea în Sănătate și Educație Fizică. Deprinderile motorii de bază, printre care și aruncarea de deasupra capului, stau la baza învățării mișcărilor și deprinderilor sportive mai complexe. Se consideră în general că amplitudinea mișcării (AM) are un rol semnificativ în execuția mișcărilor.

Obiective. Studiul de față și-a propus să identifice efectul de reducere al AM, pe care-l au exercițiile cu greutate, precum și impactul acestui efect asupra kinematicii mișcărilor.

Metode. În acest scop, un grup de subiecți supuși unui antrenament de forță a fost comparat cu unul martor, în ce privește execuția aruncării de deasupra capului.

Rezultate. Analiza datelor a arătat că amplitudinea mișcărilor de rotație internă și externă a umărului era mai scăzută la subiecții supuși antrenamentului de forță ($p < 0,05$). Deplasarea unghiulară a umărului ($p = 0,049$) și cotului ($p = 0,045$) au fost și ele semnificativ diferite, la cele două grupuri de subiecți. În plus, pattern-ul mișcărilor celor incluși în antrenamentul de forță nu se conforma principiului lanțurilor kinetice deschise.

Concluzii. Rezultatele indică faptul că pattern-ul execuției aruncării de deasupra capului este mai puțin eficient la subiecții supuși antrenamentului de forță, decât la ceilalți subiecți. Ceea ce conduce la concluzia că antrenamentul de forță are un efect negativ asupra acestei deprinderi motorii de bază, ca urmare a reducerii mobilității articulare.

Cuvinte cheie: flexibilitate, execuția mișcărilor, antrenamentul cu greutate, hipertofie.

Received: 2014, April 4; *Accepted for publication:* 2014, April 30;

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Introduction

Range of motion means the ability of joints to perform motions before getting limited due to the structure of the bones, ligaments or the surrounding muscle mass (***, 2005; Norkin & White, 1995). The physical requirements and special movement patterns in professional athletes lead to a kind of maladaptation of their musculoskeletal system (Crockett, 2002). These changes appear as a decrease in ROM, a change in biomechanical patterns, a decrease in the efficiency of force production, an increase in the possibility of musculoskeletal injuries and faulty posture (Chandler et al., 1990). Although faulty posture is not necessarily a disorder, it can lead to a decrease in optimum body mechanics (Ackland et al., 1995). Therefore, using the joints and muscles in special movement patterns and situations in the long term may shorten and stiffen the muscle tissue surrounding the joints and finally decreases the ROM (Daneshmandi et al., 2010).

Weight training is employed in many sports aiming at increasing power, strength and at decreasing the possibility of injury (***, 2001). The exercise conditions in these sports are the way that the athletes are going to acquire more power and strength through hypertrophy (Chiu & Schilling, 2005). Most of the athletes who lift weights unconsciously focus on increasing the power of pectoralis, deltoid and abdominal muscles and forget to increase the strength of the stabilizer muscles of shoulder joints (Barlow et al., 2002). Furthermore, the increase in muscle mass has been recognized as one of the main factors of decreased ROM, of dynamic shoulder instability in bodybuilders, reducing shoulder ROM in abduction and internal rotation in weightlifters, as shown in previous studies (Calhoun & Fry, 1999; Kolber et al., 2009; Kolber & Corrao, 2011; Kordi et al., 2013). Recent surveys have shown that the decrease in the internal and overall rotation of the shoulder may have a negative impact on the motor performance of the shoulder joint, i.e. through creating biomechanical inefficiency, it decreases the movement of the arm (Wilk et al., 1997). Moreover, it has been seen that the decrease in ROM can lead in the long term to the decrease in sport performance (Chandler et al., 1990; Hall & Martin, 2002).

It is generally believed that ROM has a significant role in the proper performance of many life activities (***, 2005). For example, Jelsma et al. (2013) showed a relationship between joint mobility and motor performance. People who have decreased ROM in their shoulders have difficulties in doing many activities of the daily life such as donning and doffing clothing, overhead movement, reaching and rotation activities (Hannafin & Chiaia, 2000), so that as a result of this inability, they cannot carry out physical and other social activities efficiently (Tovin & Greenfield, 2001).

The benefits and damages caused by weight training date back to many years ago (Chiu & Schilling, 2005). Although previous studies showed that weight training leads to a decrease in ROM and that ROM limitation affects motor performance, the majority of these studies focused on the relationship between ROM and motor performance in persons with motor disabilities such as developmental coordination disorder, Parkinson disease

or autism spectrum disorders (Jelsma et al., 2013). So, the main question of the present study is whether or not there is any relation between limited joint mobility and performing one of the most important motor skills such as the overhand throwing pattern. This is important because overhand throwing is one of the fundamental motor skills that are used in sports and movement activities. For example, throwing in softball and cricket, the baseball pitch, the javelin throw, the tennis serve and the netball shoulder pass are all advanced forms of the overhand throw. The presence of all or part of the overhand throw can be detected in the patterns used in these sport specific motor skills (Payne & Isaacs, 2005). The Open Kinetic Chain (OKS) is used to describe the pattern of the throwing movements. According to this principle, different body segments are linked to each other like a linkage, when the distal end is free to move, the proximal end is fixed (Lee & Chen 2004).

Hypothesis

Therefore, we are going to answer the following questions: a) Is there any relationship between ROM and kinematic aspects of the overhand throwing pattern, and b) Whose kinematic pattern of overhand throwing is closer to OKS: that of weight training participants (WTs) or of non-weight training participants (NWs)?

Material and methods

Research protocol

We mention that according to the Helsinki Declaration, the Amsterdam Protocol and Directive 86/609/EEC, the approval of the Ethics Commission of the Medical University of Arak was obtained. The research procedures were explained to all the study participants and an informed consent was also obtained from all patients prior to the study.

a) *Period and place of the research*

The study took place between October 2012 and October 2013 at the biomechanical center of The National Olympic Academy of Iran, Tehran, Iran.

b) *Subjects and groups*

The studied samples were 23 healthy men aged 12-15 years old, who were distributed as follows: ten weight training participants in the experimental group, ten non-weight training participants in the control group, and three baseball players in the reference group.

In order to create the reference pattern, three elite baseball players with the mean age of (14.41±1.23), matched with WT and NWs were used. The mean age of the WT group was (13.43±1.13) and that of the NW group was (13.33±2.57). The WT in this study were athletes who had had 3 regular exercise sessions a week for at least 3 years (Barlow et al., 2002) and the NWs were ordinary people who had had no weight training during their lifetime. All participants were right handed and had no sign of muscular skeleton injury or pain in their body one month before participating in this study. All participants took part in this research voluntarily. This study was approved by the Ethical Committee of the Tehran University of Medical Sciences.

c) *Tests applied*

According to Norkin & White (1995), the internal

rotation (IR) and external rotation (ER) of the shoulder's passive ROM was measured by a standard Baseline goniometer. All the measurements were done in the morning, after a 15 minute warm-up program; this program consisted of 3 active stretches, according to Barlow et al. (2002). To measure IR and ER of the shoulder, the humerus was positioned at 90° and the elbow was in flexion at 90°, while the subjects were lying supine. Then, the participants were required to conduct the rotation up to the end of ROM. After that, the rotation was recorded. The measurement was done for both the dominant and non-dominant sides of the participants (Norkin & White, 1995).

The images of the performance were recorded with a camera (250 Hz, 1/2000s), in two dimensions, from the right side for all the participants. The reflective markers were placed on the superior tip of the acromion, lateral humeral epicondyle, ulnar and radial styloid, distal end of third metacarpal (Fleisig et al., 2006). In an explanatory meeting, the individuals were familiarized with the purpose of the study and the way the movement pattern was performed.

In the beginning, the modeling and verbal instructions were done through the performance of a semi-skilled individual, showing film, picture and verbal explanations on the pictures (Schmidt & Wrisberg, 2004). The verbal explanations provided general information about preliminary aspects of movement skill, such as the standing position, how to catch and throw the ball. Then, the participants tried to perform the overhand throwing in three trials (Lee & Chen, 2004). In this study, the OKS principle of the participants was investigated based on velocity graphs of the shoulder, elbow and wrist joints. Filming the baseball players to construct the reference pattern was also done in the same way.

In the present study, the Edinburgh Handedness Inventory was used in order to determine the dominant hand and the Nordic questionnaire for musculoskeletal injuries was used to guarantee the absence of injuries in the participants. The validity and reliability of the Handedness Inventory (Williams, 1991) and Nordic questionnaire (Kuorinka et al., 1987) have been reported as acceptable. Also, the shoulder circumference was measured using a tape measure, based on the method proposed by Heyward (2006), which was conducted on the right side of the participants. To do so, the tape was applied snugly over the maximum bulges of the deltoid muscle, inferior to the acromion processes for shoulder girth.

d) Statistical processing

Being assured of the data normality with the

Kolmogorov-Smirnov test, to compare the ROM between the WT and the NW group, the independent t-test was used. In order to process kinematical data, the final images were put into the motion analysis software (Winalyze 4). Then, to analyze the kinematical data, they were put into Excel (2007) to draw the graphs related to the velocities of different joints. Furthermore, using the SPSS software, the data analysis was done by independent t-tests, MANOVA, ANOVA, LSD and Pearson correlation coefficient.

Results

All participants were right handed. The data related to the age and body composition of the two groups (WT & NW) showed no significant differences in age ($P=0.36$), body weight ($P=0.42$) and shoulder circumference between the groups ($P=0.25$). Yet, significant differences in height were observed ($P=0.021$).

Passive ROM

The results indicated that the passive ROM in IR and ER in the dominant and non-dominant side was significantly ($P<0.05$) lower in the WT group than in the NW group (Table I).

Kinematical features

The comparison of the kinematical features of angular displacement in three joints; shoulder, elbow and wrist among WT, NW and elite baseball players (reference group) was performed using the MANOVA test. The result of Wilks' lambda test showed that there was a significant statistical difference ($F=5.818$, $P=0.002$, partial $\eta^2=0.853$) between the three groups in the feature of angular displacement of the serve skill performance. The result of the ANOVA test suggests a significant difference in the feature of angular displacement of the shoulder ($F=5.168$, $P=0.031$), and elbow joint ($F=14.154$, $P=0.001$) between the three groups.

Next, for comparisons among the groups regarding two features of angular displacement of the shoulder and elbow, the LSD test was used. The results are shown in Table II. The movement pattern of the WTs in the angular displacement of the shoulder ($P=0.049$) and elbow ($P=0.045$) evidences a significant difference compared to the reference pattern. However, there was no that difference in the serve skill performance between the NW pattern and the reference pattern ($P>0.05$).

In Figure 1(a), the velocity graph of one of the reference group's members (M_1) is shown, in Figure 1(b), one of the WT's (E_3) and in Figure 1(c), one of the NW's (N_8) are shown.

Table I

Comparison of the mean ROM score between weight training participants and non-weight training participants.

Variables	Mean	t	sig.	Mean difference	
Dominant internal rotation	Weight training	39.33±13.48	18.666	0.03*	2.533
	Non-weight training	58.00±12.00			
Non-dominant internal rotation	Weight training	37.00±11.57	20.333	0.008*	3.299
	Non-weight training	57.33±9.68			
Dominant external rotation	Weight training	64.83±9.88	26.166	0.003*	3.925
	Non-weight training	94.00±15.28			
Non-dominant external rotation	Weight training	62.33±7.20	28.000	0.002*	4.185
	Non-weight training	90.33±14.71			

* Differences are significant at the 0.01 level (2-tailed)

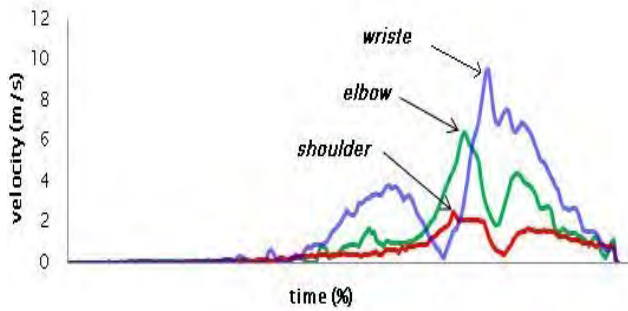


Fig. 1(a) – Velocity variation of M₁ joint (reference group).

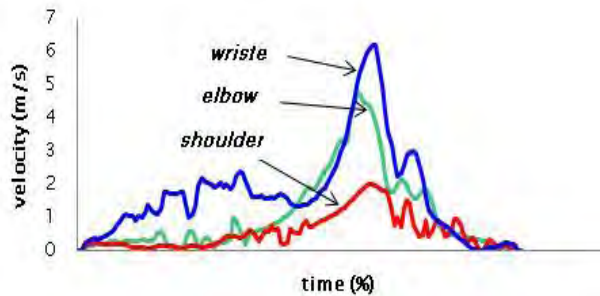


Fig. 1(b) – Velocity variation of E₃ joint (weightlifter group).

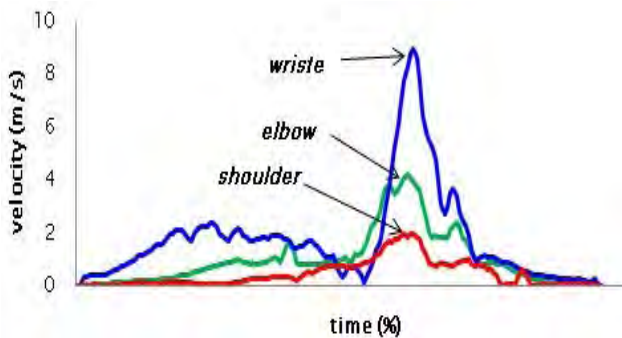


Fig. 1(c) – Velocity variation of N₈ joint (non-weightlifter group).

As it can be seen, in the graph related to the reference participant M₁, first the shoulder, then the elbow and the

wrist joint velocity reached their peak, which is completely in line with the OKC principle (Lee & Chen, 2004). However, in the case of the weight training participant E₃, first the elbow, then the shoulder and the wrist joint velocity reached their peak, which does not comply with the OKC principle (Figure 1.b vs. 1.a). As for the non-weight training participant N₈, the peak of the velocity for the shoulder and elbow respectively occurred within a short time distance and subsequently, the wrist joint velocity reached its peak (Figure 1.c). Although the performance of the mentioned participant N₈ was not similar to that of the reference individual M₁ (Figure 1.c vs. 1.a), it was closer to the OKC principle compared to participant E₃.

ROM and the movement kinematics

The correlation between the passive ROM of the IR and ER of the shoulder in the participants and their shoulder and elbow joint displacement indicated the existence of a positive and significant correlation between IR and the shoulder angular displacement ($r=0.659, P=0.02$), and also between ER and the elbow angular displacement ($r=0.626, P=0.029$) in the serve skill performance (Table III).

Discussions

The present research was aimed at observing the role of deficient ROM on the kinematical features of performing a fundamental movement pattern in adolescents participating in weight training. To do so, the performance of the overhead throwing pattern was observed in individuals having the experience of weight training and non-weight training (ordinary people or control group). At first, it was observed that the ROM of WTs in their shoulder IR and ER was lower than that of NWs ($p<0.05$). The present result is in line with the findings of previous studies performed on weightlifters (Barlow et al., 2002; Calhoon & Fry, 1999; Chang et al.1988; Kolber et al., 2009; Kolber & Corrao, 2011; Kordi et al., 2013). Barlow et al. (2002) observed that the ROM of bodybuilders in the shoulder IR and ER was lower compared to the control group. Also, another study indicates that compared to ordinary people, the ROM of power lifters is lower (Chang et al., 1988). Furthermore, Kolber and Corrao (2011) and Kolber et al. (2009) found that the ROM of male and female recreational weight

Table II

Comparison of the kinematical features of shoulder and elbow angular displacement between the groups.

Dependent variable	Group		Mean difference	Sig
Shoulder angle displacement	Weightlifters	Non-weightlifters	-23.958	0.111
	Weightlifters	Reference	-38.213*	0.049
	Non-weightlifters	Reference	14.254	0.630
Elbow angle displacement	Weightlifters	Non-weightlifters	-36.595*	0.001
	Weightlifters	Reference	-27.269*	0.045
	Non-weightlifters	Reference	9.325	0.626

* Differences are significant at the 0.05 level (2-tailed)

Table III

Correlation coefficient between ROM of internal and external rotation and angular displacement of the shoulder and elbow joints.

	Internal rotation	External rotation	Shoulder angle displacement	Elbow angle displacement
Internal rotation	1			
External rotation	0.377	1		
Shoulder angle displacement	0.659*	0.525	1	
Elbow angle displacement	0.465	0.626*	0.662*	1

training participants in their shoulder internal and external rotation was significantly lower than in the control group. In previous studies, the increase in muscular mass (Barlow et al., 2002; Calhoun & Fry, 1999), posterior shoulder tightness in weightlifters (Corrao et al., 2009; Kolber et al., 2009), muscular skeletal maladaptation due to repeated demands, particularly on ROM (Daneshmandi et al., 2010), and the unfavorable position of shoulder under heavy loads for long time periods (Corrao et al., 2009; Kolber et al., 2009; Kolber & Corrao, 2011) are mentioned as the most important factors of deficient ROM. Posterior shoulder tightness combined with muscular imbalance and hypertrophy may be responsible for the decrease of overall shoulder ROM in weight training participants (Kolber et al. 2009).

It was also observed that the kinematical features of angular displacement of movement were significantly different among the WT, NW and the reference pattern ($F=5.818$, $P=0.002$). The result of the LSD test suggested that the angular displacement of the shoulder ($P=0.049$) and elbow joint ($P=0.045$) in the WT group was significantly lower than that of the reference group. However, no significant difference was found between the angular displacement of the shoulder ($P=0.630$) and elbow ($P=0.626$) in the NW group compared to the reference group.

One of our observations was related to the change in the joint velocity while performing the overhead throwing pattern. According to the OKC principle for overhand throwing patterns, first the proximal and then the distal segments of the body perform the motion. Therefore, the shoulder, elbow and wrist respectively must reach their highest velocity (Lee & Chen, 2004). As observed through the comparison of the graphs related to the variations in the velocity of the shoulder, elbow and wrist motion of the participants ($M_1-E_3-N_8$) the WTs' performance was not based on the OKC principle (Figure 1.a), but the NWs' performance was closer to OKC (Figure 1.b). As a result, it can be said that the performance pattern of the NW group (N_8 , see Figure 1.c) was better than that of the WT group (E_3).

Generally, the relation between ROM and movement disabilities has been investigated by Dunlop et al. (1998), who implicitly point to joint impairment as an indication of future disability. ROM deficit leads to a decrease in the ability of performing physical activities and other effective behaviors and consequently, to the functional limitation of the individuals (Tovin & Greenfield, 2001). Impaired posture and impaired muscle performance have been mentioned among the causes of shoulder ROM deficit. Generally, weight training exercises cause the shoulder to get in an unfavorable position such as end-range ER (Kolber & Corrao, 2011). Also, most of the weight training upper extremity exercises focus on increasing the mass and strength of the big muscles and ignore the smaller ones that have the role of stabilizing the shoulder (Barlow et al., 2002; Kolber et al., 2009), which has been recognized as leading to shoulder impairment (Haupt, 2001; Neviaser, 1991), shoulder motor imbalance (Kolber & Corrao, 2011) and posterior shoulder tightness (Corrao et al., 2009; Kolber et al., 2009; Kolber & Corrao, 2011). While the ordinary

performance of the shoulder requires a fine balance between the strength and mobility of muscle groups which are supposed to act synchronously (Kolber & Corrao, 2011), weight training exercise which is performed based on special muscle groups generally ignores the balance between strength and mobility required for the appropriate function of the shoulder (Kolber et al., 2009). Also, joint kinetics has an essential role in the velocity of overhead movements (Bergün et al., 2009). Takahashi et al. (2000) showed that finger and wrist flexibility plays an important role in performing kinematical features. Therefore, these could be the reasons for the difference between the WTs' performance pattern and the OKC principle.

Finally, the result of the Pearson correlation test indicated a significant and positive relationship between the ROM of shoulder IR and the shoulder joint angular displacement, between ER and the elbow joint angular displacement ($P<0.05$). On the other hand, the participants who had a higher ROM in shoulder IR and ER had a higher joint angular displacement in the serve skill performance. Therefore, people who had a lower passive ROM also had a lower angular displacement of the joints. Moreover, Brown et al. (2000) found that ROM deficit is one of the factors creating physical frailty. As it was seen, the ER of the shoulder was significantly correlated with the physical performance test. Also, it is said that there is a strong correlation between ROM and arm performance (Bland et al., 2008). For example, limiting ROM of the shoulder decreases the arm performance in young healthy individuals (Bland et al., 2008). Accordingly, it can be said that the mentioned results are in accordance with other study findings.

Conclusions

1. The important point in this research was observing the closeness of movement patterns of ordinary participants to those of the reference group, i.e. ROM deficit following heavy weight training can cause inefficiency in performing the overhead throwing movement pattern in WTs.

2. This issue is noteworthy when we get to know that this pattern is related to many sport skills. Also, it can be predicted that the performance pattern of WTs is not appropriate for other overhead throwing skills. Therefore, we suggest the further investigation of this issue in future studies. It should be mentioned that the small sample size and the two-dimensional analysis of the motions were the limitations of the present study. Hence, it is suggested that the results of the present study be generalized with caution.

Conflicts of interest

There are no conflicts of interest.

Acknowledgement

We wish to thank all the members who participated in this study. Special thanks to Dr. Hassan Khalaji (faculty member of Arak University), Dr. Elham Shirzad (Iran's Olympic National Academy) and Adel Soltani for their contribution and technical support. We also express our thanks to Kamran Shakiba Rad and Kamal Shakiba Rad for the translation.

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Physical education for the correction of dysgraphia in primary school pupils

Educația fizică în corectarea disgrafiei la elevii din clasele primare

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Abstract

Background. The topic of high current interest approached in this research is the use of physical education activities in school for the correction of dysgraphia. We proposed in this paper a psycho-pedagogical physical education model for the correction of dysgraphia in primary school pupils.

Objectives. Elucidation of psychomotor peculiarities in pupils with dysgraphia. Fundamentation, development and approval of a psycho-pedagogical model for the correction of dysgraphia by physical education methods in primary school pupils. Experimental validation of the efficiency of the psycho-pedagogical model for the correction of dysgraphia by physical education methods in primary school pupils.

Methods. Assessment of the psychomotor status of pupils by testing their motor reaction to sound and light, with the DP-1 reflex measuring device.

Results. At the end of the research, a study for the argumentation of the efficiency of specific physical education means for the correction of dysgraphia was performed, using methods for the initial and final investigation of psychomotricity in primary school pupils.

Conclusions. The development of psychomotricity in primary school pupils with writing disorders is particularly important because the application of specific physical education methods and techniques contributes to the correction of these disorders.

Key words: psychomotricity, dysgraphia, motricity, psycho-pedagogical model.

Rezumat

Premize. Actualitatea temei abordate în cercetarea de față este determinată de valorificarea activităților de educație fizică în școală, în scopul corectării disgrafiei. Am propus, în lucrarea de față, un model psihopedagogic de educație fizică, orientat pentru corecția disgrafiei la elevii din învățământul primar.

Obiective. Elucidarea particularităților psihomotrice la elevii cu disgrafie. Fundamentarea, elaborarea și aprobarea Modelului psihopedagogic de corectare a disgrafiei prin influența mijloacelor de educație fizică la elevii din clasele primare. Validarea experimentală a eficacității Modelului psihopedagogic de corectare a disgrafiei prin influența mijloacelor de educație fizică la elevii din clasele primare.

Metode. Aprecierea stării psihomotorie a elevilor prin testarea reacției motorii la sunet și lumină, cu dispozitivul de măsurare reflex DP -1 .

Rezultate. În finalul lucrării s-a realizat un studiu de argumentare a eficacității mijloacelor specifice de educație fizică în corectarea disgrafiei, utilizând metode de cercetare inițială și finală a psihomotricității elevilor din învățământul primar.

Concluzii. Dezvoltarea psihomotricității la elevii cu tulburări de scriere din clasele primare deține un loc semnificativ, deoarece aplicarea mijloacelor și metodelor specifice educației fizice contribuie la corectarea acestor tulburări.

Cuvinte cheie: psihomotricitate, disgrafie, motricitate, model psihopedagogic.

Received: 2014, April 24; *Accepted for publication:* 2014, June 21;

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Introduction

Nowadays, there is a huge number of primary school pupils with different psychomotor development problems, which result in learning, and especially, writing disorders. Dysgraphia is a written language learning disability with negative effects on the formation of the pupil's personality in primary school, having a clear effect at middle and high school age (Verza, 1983).

Dysgraphia means having severe problems with the written word, which is affected by extreme difficulty with fine motor skills - in spite of having normal intelligence and abilities.

Dysgraphia can have a negative impact on the success of a child in school. Many children with dysgraphia are not able to keep up with written assignments, cannot put coherent thoughts together on paper, or write legibly. This disability needs to be recognized and remedied before it creates long lasting negative consequences for the child (Crouch & Jakubecy, 2007).

Physical education in primary school, as a component of the teaching-learning school process, is aimed at contributing to the improvement of physical and intellectual development, of the pupils' motor skills, which is a fundamental category of the physical exercise practice system in the formation of psychomotor skills (Rață, 2008).

The process of writing needs abilities, complex skills, which are difficult to assimilate and practice correctly (Burllea, 2007). They involve a large degree of symbolization and abstracting, an intellectual activity and a high level of psychomotor development (Stănescu, 2002).

Horghidan (2000) reports that it is a complex function which integrates and conjugates motor and psychic aspects determining individual behavior regulation and involving perceptive and individual functions, information reception and an adequate execution of the response act.

The process of writing integrates the neuro-psychomotor system (Capellini, 2010). This phenomenon is explained by the fact that at proprioceptive level, with the movement organization function by somesthesia, some sensory organs that are found in muscles, tendons, ligaments are sending and receiving nervous impulses about muscle contraction or relaxation; so, about muscle contraction, upper limb position and different movements that are used in writing (Navoloaca, 2008).

In this context, we should emphasize the fact that positive emotional motor instrumentality, with an active character of psychomotor development, accelerates the formation of a stable psyche, coordinates the activity from the motor centers of sensory receptors, interprets and creates motor presentations (Burllea, 2007). At the same time, very importantly, it normalizes and stabilizes the excitement and inhibition of the nervous system, which are so important for the graphic image formation (Maximenco, 2001).

Although there are a lot of studies about the role of physical education classes for the correction of dysgraphia by the development of the psychomotor sphere in primary school pupils, they need a proper interpretation and a larger experimental basis.

In this research, we mainly focused on motor dysgraphia because the literature (Drozdova, 2005; Caisin & Racu, 2011) provides data according to which motor dysgraphia

is most common in pupils.

Motor dysgraphia does not affect the symbolization of writing, but rather the shape of letters and the quality of writing. Etiologically, dysgraphia is due to maturational, emotional, educational, or mixed factors (1). Regarding maturational factors, alterations in the psychomotor development may affect lateralization, psychomotor efficiency, body schema, perceptual-motor functions, and graphic expression of language (Martins et al., 2013). Motor dysgraphia is due to deficient fine motor skills, poor dexterity, poor muscle tone, or unspecified motor clumsiness (Auclair et al., 2008). Letter formation may be acceptable in very short samples of writing, but this requires extreme effort and an unreasonable amount of time to accomplish, and it cannot be sustained for a significant length of time, as it can cause arthritis-like tensing of the hand (David, 2003). Overall, written work is poor to illegible even if copied by sight from another document, and drawing is difficult. Oral spelling for these individuals is normal, and their finger tapping speed is below normal. This shows that there are problems within the fine motor skills of these individuals. People with developmental coordination disorder may also suffer from dysgraphia. Writing is often slanted due to holding a pen or pencil incorrectly (Crouch & Jakubecy, 2007).

While there are a large number of studies about the role of physical education in logopaedics, there are still some unresolved problems related to the influence of physical education methods for the correction of diverse learning disorders including writing disorders by the development of the psychomotor sphere in primary school pupils.

Objectives

The aim of the work consists of setting the theoretical bases and elaborating a psycho-pedagogical model for the correction of dysgraphia by physical education methods in primary school pupils with writing disorders.

The objectives of the research

1. Analysis of the theoretical highlights of the correction of writing disability in primary school pupils by physical education methods.
2. Elucidation of psychomotor peculiarities in pupils with dysgraphia.
3. Fundamentation, development and approval of the psycho-pedagogical model for the correction of dysgraphia by physical education methods in primary school pupils.
4. Experimental validation of the efficiency of the psycho-pedagogical model for the correction of writing disability by physical education in primary school pupils.

Hypothesis

It is assumed that the elaboration of a program of the influence of specific physical education methods on the development of fine psychomotricity will contribute to the efficiency of the correction of writing disability in primary school pupils.

Material and methods

Research protocol

We mention that the study met the requirements of the Helsinki Declaration, the Amsterdam Protocol and Directive 86/609/EEC, and the approval of the

Ethical Commission of the Scientific Laboratory of the Chişinău Physical Education and Sports University was obtained.

The methodology was based on the modern scientific work of Bernştein and Dragnea (quoted by Rusnac, 1998), on the ideas and approaches of the methodological and organizational insurance, which allowed a high level of experimental research.

Period and place of the research

The study was conducted during a preparatory period from September 2012 to May 2013. The experimental groups were selected from M. Sadoveanu and G. Asachi high schools.

Subjects and groups

The experimental group consisted of 2nd form pupils (boys) with motor dysgraphia and included 15 subjects. The control group also consisted of 15 pupils with motor dysgraphia, 2nd form.

Tests applied

For the assessment of the psychomotor status of the primary school pupils with dysgraphia, the most indicated test was the following: motor reaction to sound and light - a DP-1 reflex measuring device was used. The testing of the motor reaction to light and sound stimuli used the special method consisting of the following procedure: the examiner pushes the button "trainer" and as a result launches a process of emission of sounds or light spots with the duration of 0.5 sec. After an indeterminate time for the examined person, the device launches a light or sound signal, to which the examined person should react by touching the button.

Complex motor reaction to a moving object - the measurement was made by a DP-1 reaction measuring device. With this method, the moving object was time. The measuring procedure consisted of the following instructions: a stopwatch is included in the device that counts time within a 15 sec limit; the examinee has the task to push the button on his console and to fix the stopwatch on command for 10 sec.; the examinee has 10 attempts in this test, with the further average significance measurement; there are "on time" reactions by the exact stopping of the stopwatch at 10 sec index and also "ahead of time reactions" and "delayed reactions" (the button is pushed after the indication - up to 10 sec).

The "tapping" test - the measurement with this device was made using a proper method which consists of the following test: during 4 time periods (10 sec each), the device will measure the maximum number of the board touches by the needle probe that is in the examinee's hand. The examinee should touch the board as many times as he can during each time period without any retention.

Statistical processing

The mathematical and statistical calculations were performed using Microsoft Office Excel methods.

Results

The diversity of psychomotor development inefficiencies in pupils with dysgraphia oriented us through the elaboration of the psycho-pedagogical model for the correction of dysgraphia by physical education methods in primary school pupils, which provides a number of physical exercises: for psychomotor development; general motricity; fine hand motricity (Figure 1).

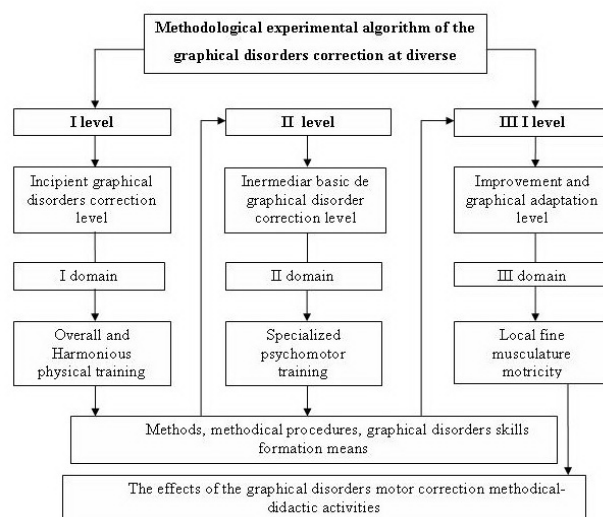


Fig. 1 – Experimental psycho-pedagogical model for the motor dysgraphia correction algorithm during the extracurricular physical education activity in primary school pupils.

For highlighting the efficiency of the influence of physical education on the correction of dysgraphia, a pedagogical experiment was organized and conducted during an academic year (Table I). The experiment was based on the synthesis of the theoretical premises and specific objectives previously stated. Thereby, two experimental groups of pupils (boys) were formed: an experimental group and a control group.

Table II shows the results of psychomotor testing in pupils with motor dysgraphia, including both the experimental and the control group.

Discussion

As shown in Table II, for the assessment of the psychomotor status of the pupils involved in the experiment, special tests were used which reflect the simple motor reaction to sound and light, the complex reaction to

Table I
Distribution of the experimental model classes in 2nd form pupils during the extracurricular activity for the correction of dysgraphia.

Methodical-didactic system	Incipient level of the correction of dysgraphia	Intermediate basic level	Improvement and graphical adaptation level	Evaluation	Total hours
Overall physical training	32	-	-	2	32
Specialized psychomotor training	-	50	-	2	52
Local fine musculature motricity development	-	-	20	2	22
Total hours	32	50	20	6	108

Table II

A comparative analysis of the test results of the psychomotor status in 2nd form pupils, the experimental group and the control group with dysgraphia.

№ d/o	Tests	Groups & statistics	Initial indices $\bar{X} \pm m$	Final indices $\bar{X} \pm m$	Statistics	
					t	p
Psychomotor condition						
1.	Motor reaction to sound (ms)	E	0.36±0.03	0.24±0.02	4.40	<0.001
		C	0.39±0.03	0.34±0.03	1.67	>0.05
		t	0.75	2.25	—	—
		P	>0.05	<0.05	—	—
2.	Motor reaction to light (ms)	E	0.35±0.03	0.23±0.02	4.80	<0.001
		C	0.36±0.03	0.33±0.03	1.33	>0.05
		t	0.25	2.25	—	—
		P	>0.05	<0.05	—	—
3.	Motor reaction to the moving object (ms)	E	10.18±0.31	9.07±0.27	3.61	<0.01
		C	10.43±0.32	9.91±0.30	1.79	>0.05
		t	0.57	2.10	—	—
		P	>0.05	<0.05	—	—
3.1.	Number of on time reactions (%)	E	7	79		$\Delta + 72$
		C	8	13		$\Delta + 5$
3.2.	Number of early reactions (%)	E	28	12		$\Delta - 16$
		C	26	24		$\Delta - 2$
3.3.	Number of late reactions (%)	E	65	9		$\Delta - 56$
		C	66	63		$\Delta - 3$
4.	“Tapping” test 40 sec (no. of touches)	E	170.85±7.18	203.17±6.	4.84	<0.001
		C	172.30±7.13	181.18±7.00	1.33	>0.05
		t	0.14	2.23	—	—
		P	>0.05	<0.05	—	—
4.1.	Decrease of the number of touches from 1 to 4 on quadrate (%)	E	42	28		$\Delta - 14$
		C	41	32		$\Delta - 9$

Note: f - 14 P - 0.05; 0.01; 0.001

f - 28 P - 0.05; 0.01; 0.001

E – experimental group

C – control group

t = 2.145 2.977

4.140t = 2.048 2.763 3.674

the moving object and the rapidity level of the elementary movements. The tapping test reflects the complex development state of the fine psychomotor activity of the experimental and control groups at the beginning and at the end of the experiment. The results of the comparative research of the statistical features at the beginning of the experiment show that they are homogeneous ($P > 0.05$). A comparative analysis of the results of the control group in the dynamics of the academic year evidenced that the mean statistical indices had slightly changed at the end of the experiment, so some improvement of the tapping test indices was found (9%); however, the simple reaction to sound and light stimuli and the general reaction to the moving object did not have an authentic character of the experiment development $P > 0.05$.

In our opinion, overall psychomotor development in pupils from the control group shows at the same time motor activism, but it is decreasing in traditional physical education lessons. At the same time the study of the data of the psychomotor test in the experimental group shown in Table II can confirm that at the end of the experiment, final data compared to initial data were significantly improved $P < 0.01-0.001$. So, the test indices characterizing the simple motor reaction to sound and light, the general reaction to the moving object, as well as speed capacity in the tapping test were improved. It should be noted that in the experimental group, the complex reaction components to the moving object were considerably improved: 72% more on time reactions; 16% less early reactions and 56%

less late reactions. The improvement of indices in the tapping test by 14% at the end of the experiment shows the condition of the nervous system's motor centers, with a 5% decrease in the motor fatigue of the nervous system in the experimental group compared to the control group. These positive results of the experimental group pupils largely reflect the effective ensuring of motor activism by special extracurricular physical education activity.

A comparative analysis of the indices obtained at the end of the experiment shows that between the experimental and the control group there was a difference in all motor tests at $P < 0.05$, which confirms the priority of the motor development of the experimental group pupils for the correction of dysgraphia by the influence of physical education in primary school pupils (Lupuleac, 2013).

By analyzing the psychomotor development in the experimental group pupils, it can be noted that during the experiment there were improved results in all applied tests. We can confirm the fact that on account of the psychopedagogical model for the correction of dysgraphia by the influence of physical education in primary school pupils from the experimental group, not only a positive but also a significant improvement of the psychomotor status was achieved.

Conclusions

Based on the investigation, we can formulate the following conclusions:

1. It has been analytically shown that physical

education represents a complex combination of specific components that can reveal the correction of dysgraphia.

2. The fundamentation of the psycho-pedagogical model for the correction of dysgraphia by the influence of physical education in primary school pupils has established an interconnection between purpose, objectives and dysgraphia correction levels. Therefore, the psycho-pedagogical model for the correction of dysgraphia by the influence of physical education in primary school pupils represents a conceptual construct that directs pedagogical interventions towards a larger number of physical education aspects: general, social and psychomotor physical.

3. The implementation of the psycho-pedagogical model for the correction of dysgraphia by the influence of physical education in primary school pupils supports the fact that placing the emphasis on specific physical education means can contribute to a substantial improvement of the writing process $P < 0.01-0.001$.

Conflicts of interest

There are no conflicts of interest.

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Study on the influence of exercises on the body mass index in first year students

Studiu privind influența exercițiilor fizice asupra indicelui de masă corporală la studentele de anul I

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Abstract

Background. More and more studies show the role of exercise in maintaining the health of the individual, a key factor being the control of body weight. This can also be achieved through systematic practice of physical exercises.

Objectives. The research aimed to determine the effect of physical exercises, as aerobic gymnastics, over the female student's body mass in the survey.

Method. The research was conducted over a period of 14 weeks (10.01.2013 - 17.01.2014) with a total of 60 students, aged between 19 and 20 years, from the North University Center of Baia Mare. The group of students was divided into two smaller groups (experimental and control). At the beginning of the semester (T1), female students were measured, height and weight parameters being required to calculate the body mass index (BMI). On the last week of the experiment, the final results were measured and recorded (T2). During this period, the experimental group participated in a weekly aerobics class and the control group attended conventional physical education lessons. At the end, elements of descriptive statistics were calculated, the data obtained being presented using indicators of centralization, location and distribution. To test the normal distribution, we used the Shapiro-Wilk test. Variance was tested with the F or Levene and/or Bartlett tests.

Results. Data recorded at the initial testing were compared with data recorded in the final tests. Through the statistical analysis for *body weight* values, in the case of paired samples (*moments T1-T2*), we observed highly significant differences for both groups ($p < 0.01$). On the statistical analysis of *BMI* values (*moments T1-T2*), there were statistically significant differences in the experimental group ($p < 0.05$) and insignificant differences in the control group ($p > 0.05$).

Conclusions. Exercise practiced as aerobic gymnastics have a greater positive influence on BMI in students in the experimental group compared to the control group, so we deduce that the use of aerobic gymnastics in the gym class for female students is beneficial in terms of improving BMI.

Key words: exercise, aerobics gymnastics, body mass index.

Rezumat

Premize. Tot mai multe studii arată rolul exercițiilor fizice în menținerea stării de sănătate a individului, un element cheie fiind controlul masei corporale. Aceasta se poate realiza și prin practicarea sistematică a exercițiilor fizice.

Obiective. Cercetarea și-a propus să evidențieze efectul exercițiilor fizice, sub forma gimnasticii aerobice, asupra masei corporale a studentelor participante la studiu.

Metode. Cercetarea s-a desfășurat pe o perioadă de 14 săptămâni (1.10.2013 - 17.01.2014) și s-a realizat pe un număr de 60 studente, cu vârsta între 19- 20 ani, din Centrul Universitar Nord din Baia Mare, împărțite în două loturi (experimental și de control). La începutul semestrului (T_1) s-au măsurat înălțimea și greutatea studentelor, parametri necesari calculării indicelui de masă corporală (IMC), iar în ultima săptămână s-au măsurat și înregistrat rezultatele finale (T_2). Pe această perioadă lotul experimental a beneficiat de o oră tip gimnastică aerobică săptămânal, iar lotul de control a beneficiat de lecția clasică de educație fizică. La final au fost calculate elemente de statistică descriptivă, datele fiind prezentate utilizând indicatori de centralizare, localizare și distribuție. Pentru testarea distribuției normale s-a folosit testul Shapiro-Wilk. Variația a fost testată cu testele F sau Levene și/sau Bartlett.

Rezultate. La analiza statistică a valorilor *masei corporale pentru probe perechi (momentele T1-T2)*, au fost observate statistic diferențe foarte semnificative pentru ambele grupe ($p < 0,01$). La analiza statistică a valorilor IBM (*momentele T₁-T₂*), au fost observate diferențe statistic semnificative la grupa experiment ($p < 0,05$) și ne semnificative la grupa de control ($p > 0,05$).

Concluzii. Exercițiile fizice practicate sub forma gimnasticii aerobice au avut o influență pozitivă mai mare asupra IBM la studentele din lotul experimental, comparativ cu studentele din lotul de control, de unde deducem că folosirea gimnasticii aerobice în ora de sport la studente, este benefică sub aspectul îmbunătățirii IBM.

Cuvinte cheie: exerciții fizice, gimnastică aerobică, indice de masă corporală.

Received: 2014, April 1; Accepted for publication: 2014, April 30;

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Introduction

The main objective of physical education and sport is to improve and maintain health. The importance of this objective for every human being emerges from the definition of health; if one has physical, mental and social welfare, one has a comfortable balance in life. This comfort is achieved by physical activity. Almost 2000 years ago, Hippocrates and Galen confirmed the existing relationship between movement and physical and mental health. Preparedness for activity of an individual is closely related to physical condition. The body structure, the proportion of fat and muscle to total weight and height, is important in maintaining optimal physical condition (Dumitrescu et al., 2013).

An improved physical condition motivates one to perform their daily activities with sufficient energy and it also helps maintaining one's body weight within normal parameters, an element of particular importance, especially for young students, from a physical and mental point of view.

The vast majority of young people consider sports as either a casual activity or an activity designed to achieve performance (Ganciu, 2009).

Furthermore, studies have shown that body mass index (BMI) levels correlate with body fat and future health risks. Excess adipose tissue (obesity) has been shown to be deleterious for multiple body organ systems through thrombogenic, atherogenic, oncogenic, hemodynamic and neurohumoral mechanisms and has been linked to multiple medical conditions, such as diabetes, heart disease and several types of cancer (Poirier et al., 2006). BMI, which shows reasonably good correlations with more direct measures of adiposity and consistent linkages with adult overweight- and obesity-related co-morbidities, will likely continue to be the main measure of weight status in children (Must & Anderson, 2006).

A recent review of screening for pediatric overweight undertaken by the US Preventive Services Task Force came to a similar conclusion (Whitlock et al., 2005). Widespread adoption of BMI-for-age will depend upon continued efforts to train individuals in the appropriate use of national and international growth references (Anderson et al., 2006).

Direct but simple measures of body fatness and measures of body fat distribution may be helpful in such individuals to further stratify them according to their level of body fatness (Romero-Corral et al., 2008).

Based on the keywords: exercise, aerobics, body mass index, we will try to define these concepts. Exercise is, in didactic sense, the most important tool with multiple functions and applications in planning and delivering the training process (Hanțiu, 2013).

Aerobics is a physical sports activity with many positive aspects, having as a main reference feature the motor and mental capacity of the individual, with beneficial effects on physical condition and health (Grosu, 2010).

BMI is an indirect anthropometric indicator and also, a method for checking the health status. The body mass index is an appropriate screening test to identify children who should have further evaluation and follow-up, but it is

not diagnostic of the level of adiposity (Freedman, 2009). BMI must be interpreted relative to age and sex (Reilly, 2006).

Objectives

The research aims to highlight the effects of exercise, as aerobic gymnastics, on the body mass of the surveyed female students.

Hypothesis

We assume that by applying body styling programs, as part of aerobics, to the experimental group, the body mass index will improve, compared to the control group, who performs regular physical education classes.

Material and methods

Research protocol

We mention that we obtained the approval of the Ethics Commission of the North University Center of Baia Mare to carry out the survey. We also obtained the written consent of the subjects to participate in this research.

a) *Period and place of the research*

The research was conducted at the North University Center in Baia Mare, over a period of 14 weeks (01.10.2013 - 01.17.2014).

b) *Subjects and groups*

The experiment was conducted on a sample of 60 first year students, aged between 19 and 20 years, divided into two groups (experimental and control).

c) *Tests applied*

At the beginning of the semester (T_1), the height and the body mass of female students were measured, these parameters being required to calculate BMI, and on the last week the final results were measured and recorded (T_2). During one semester, the experimental group participated in an aerobics class for one hour weekly, and the control group attended conventional physical education lessons. The complexes of exercises used were a combination of personal ideas and other authors' ideas: Dobrescu, (2008), Grosu, (2012), Stoica, (2011).

The technical content of the operational resources used, the working methods and scientific delineation of the main notions employed were correlated with the latest trends in choreography and music (Moraru, 2012).

d) *Statistical processing*

Statistical indicators: elements of descriptive statistics were calculated, the data being presented by using indicators of centralization, location and distribution.

In order to test the normal distribution, the Shapiro-Wilk test was used. Variance was tested with the F or Levene and/or Bartlett tests.

We used the t (Student) test for normal distribution data, and for uneven distribution rank values, we used the non-parametric Mann-Whitney test (U) for two unpaired samples, or the Wilcoxon test for paired samples.

To detect the correlation between two continuous quantitative variables with normal distribution (uniform), we used the Pearson correlation coefficient (r). For the uneven distribution of variables, we used Spearman's rank correlation coefficient (ρ). The analysis of correlation

coefficients was performed using Colton's rule.

Results

Indicator analysis

The data recorded at the initial testing (T1) and final testing (T2) for the two groups were summarized in Table I.

Discussion

On the statistical analysis of body mass values for paired samples (moments T₁-T₂), highly statistically significant differences were observed for both groups (p <0.01), as shown in Table I.

On the statistical analysis of body mass values for unpaired samples, no statistically significant differences were observed between the two groups.

Between moments T₁ and T₂, there were no changes in height in the two groups of athletes. For unpaired samples, statistically significant differences were observed between the two groups in both time points.

On the statistical analysis of paired samples for BMI values (moments T₁-T₂), statistically significant differences were observed in group I (experimental) (p<0.05) and insignificant differences were seen in group II (control) (p>0.05). For the unpaired samples, there were no statistically significant differences between the two groups in either of the two points.

Correlation analysis

Statistical analysis. The correlation data in the two studied groups are found in Table II.

Moment analysis

a) According to the results presented in Table II, it is apparent that at moment T₁, for the first group, the statistical analysis of the correlation between the indicator values evidences, as shown in Figure 1a, that there is a good positive correlation between BM and BMI (r²=0.7228).

For group II, the statistical analysis of the correlation between the values of the studied indicators, presented in Figure 2a, shows a good positive correlation between BM and BMI (r²=0.6934).

b) At moment T₂: For group I, the statistical analysis of the correlation between the values of the studied indicators, presented in Figure 1b, reveals a very good positive correlation between BM and BMI (r²=0.701).

For group II, the statistical analysis of the correlation between the values of the studied indicators, presented in Figure 2b, shows a good positive correlation between BM and BMI (r²=0.6548).

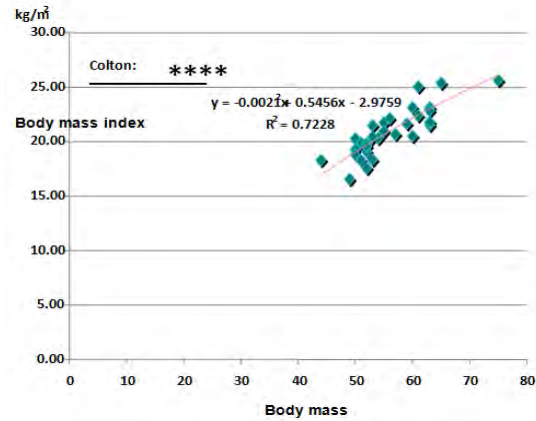


Fig. 1a – Group I, moment T1: BM – BMI correlation.

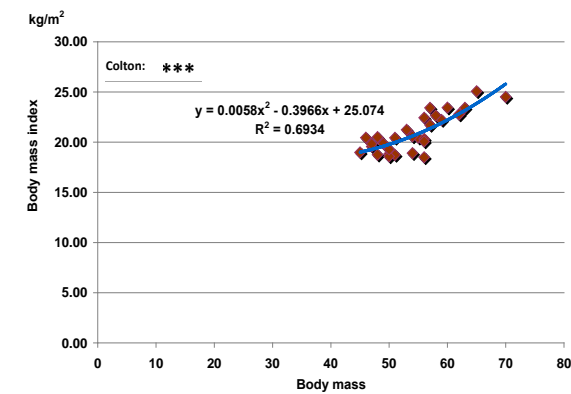


Fig. 2a – Group II, moment T₁: BM - BMI correlation

Table I

The comparative analysis of the values in the two study groups, and statistical significance.

Indicator	Group	Moment	Mean	SE	Median	SD	Min.	Max.	Statistical significance (p)	
									Unpaired samples	Paired samples
Body mass	I	T1	56.07	1.1636	54.50	6.3731	44	75	T ₁ : 0.3439	Group I: 0.0052
		T2	55.63	1.1012	53.50	6.0314	44	72		
	II	T1	54.50	1.1232	54.5	6.1518	45	70	T ₂ : 0.4286	Group II: 0.0089
		T2	54.23	1.0512	54.5	5.7577	45	68		
Height	I	T1	163.83	0.9161	163.00	5.0178	155	172	T ₁ : 0.0572	Group I: –
		T2	163.83	0.9161	163.00	5.0178	155	172		
	II	T1	161.23	0.9775	161.5	5.3542	150	174	T ₂ : 0.0572	Group II: –
		T2	161.23	0.9775	161.5	5.3542	150	174		
BMI	I	T1	20.90	0.4094	20.60	2.2425	16.56	25.65	T ₁ : 0.7663	Group I: 0.0156
		T2	20.74	0.3923	20.38	2.1488	16.56	24.98		
	II	T1	20.94	0.3482	20.45	1.9069	18.50	25.08	T ₂ : 0.9211	Group II: 0.2394
		T2	20.84	0.3260	20.45	1.7854	18.50	24.69		

Table II

Statistical analysis of correlation between the values of the indicators studied in the two groups of athletes.

Indicator \ Moment	T1		T2	
	Group I	Group II	Group I	Group II
BM - height	0.2262	* 0.5700	*** 0.2293	* 0.5753
BM – BMI	0.7228	*** 0.6934	*** 0.701	*** 0.6548
Height – BMI	-0.2049	* -0.0589	* -0.2350	* -0.1064

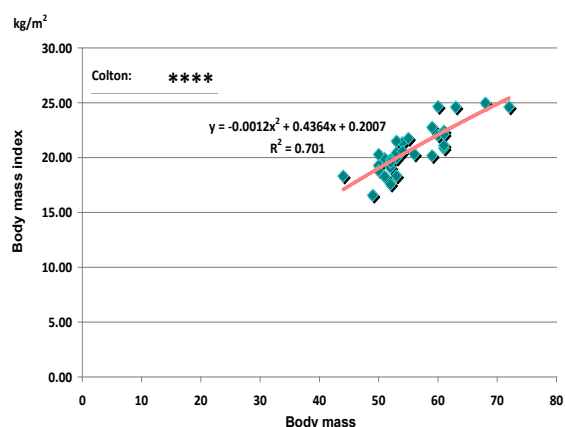


Fig. 1b – Group I, moment T_2 : BM - BMI correlation.

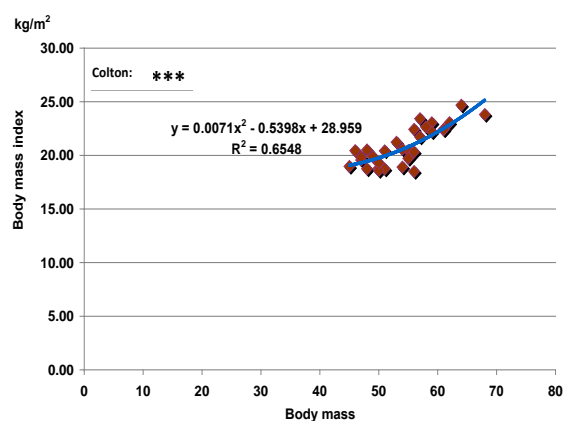


Fig. 2b – Group II, moment T_2 : BM - BMI correlation.

Conclusions

1. By comparing the values obtained at the initial testing (T_1) to final values (T_2), following statistical processing, an improvement in the body mass of the experimental group to the detriment of the control group can be seen.

2. The positive results achieved on the statistical significance test allow us to conclude that the statistical differences obtained between the two experimental and control groups are due to the means used as an independent variable in the experiment.

3. The significant differences of the results validate the research hypothesis.

4. The good and very good correlations obtained from the statistical analysis of the Spearman correlation coefficient for the studied indicators, at the two moments T_1 and T_2 , enable us to conclude that exercise introduced in the experiment proved its efficacy, which confirms the research hypothesis.

Conflicts of interests

Nothing to declare.

Acknowledgement

The paper is part of the research for the author's doctoral thesis.

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REVIEWS
ARTICOLE DE SINTEZĂ

The importance of omega-3 fatty acids in diet **Importanța acizilor grași omega 3 în alimentație**

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Abstract

Essential fatty acids are lipids that cannot be synthesized by the organism, but must be provided by diet. The two most important fatty acid classes are omega-3 and omega-6 polyunsaturated fatty acids. The importance of the beneficial effects of omega-3 fatty acids has been demonstrated by many studies that support their role as nutrients, as well as their beneficial protective and prophylactic role. Omega-3 fatty acids contain substances – eicosanoids, with multiple effects on the body functions. They are used for therapeutic purposes in mental diseases; cardiovascular diseases; inflammatory diseases; autoimmune diseases; herpes; multiple sclerosis; psoriasis, dermatitis, diabetes, cancer, arthritis, gout, allergies; weight loss. Studies on omega-3 PUFA and physical activity in animals or human subjects have shown contradictory effects: favorable and unfavorable. Different studies have evidenced contradictory data regarding the influence of dietary supplementation with omega-3 PUFA on the O/AO balance during physical exercise.

Key words: omega-3 fatty acids, diet, health.

Rezumat

Acizii grași esențiali sunt lipide care nu pot fi sintetizate de organism, dar trebuie asigurate prin dietă. Două clase de acizi grași sunt mai importate – acizii grași polinesaturați omega 3 și omega 6. Importanța efectelor benefice ale acizilor grași omega 3 a fost demonstrată de numeroase studii care pledează pentru necesitatea lor ca nutrienți și rolul lor benefic protector și profilactic. Acizii grași omega 3 conțin substanțe – eicosanoizi, cu efecte multiple asupra funcțiilor organismului. Sunt utilizați în scop terapeutic în boli psihice; boli cardiovasculare; boli inflamatorii; boli autoimune; herpes; scleroză multiplă; psoriazis, dermatite, diabet, cancer, artrite, gută, alergii; scădere în greutate. Studiile privind AGPN omega 3 și activitatea fizică, pe animale sau subiecți umani, au arătat efecte contradictorii: favorabile și nefavorabile. Diferite studii au evidențiat date contradictorii privind influența suplimentării dietei cu AGPN omega 3 asupra balanței O/AO în efortul fizic.

Cuvinte cheie: acizi grași omega 3, alimentație, sănătate.

General considerations

Essential fatty acids (EFAs) are lipids that cannot be synthesized by the organism, but must be provided by diet. They have a hydrocarbon chain of variable length with double bonds. The position of the first double bond (omega) differentiates omega-3 from omega-6 polyunsaturated fatty acids (Dobreanu 2010). Of these, two classes are more important – omega polyunsaturated fatty acids (PUFA):

- Class n=3 (C_{18:3}): α -linolenic acid (ALA), eicosapentaenoic acid (EPA), docohexaenoic acid (DHA)
- Class n=6 (C_{18:2}): linoleic acid (LA), cis-linoleic acid (cis LA), γ -linoleic acid (GLA)

Omega-3 PUFA sources are present in phospholipids in marine animals, lower animals, cold water fish, trout, sardine, salmon, tuna, herring, anchovy, black cod, shrimp and fish oil, as well as in green leaf plants, linen seeds, canola seeds, walnuts, peanuts, soybeans, purslane, nuts, almonds.

Omega-6 PUFA sources are of plant origin: corn, soybean, saffron, sunflower, safflower, canola oil.

Current diet provides a low omega-3 EFA intake. The ratio between omega-6 EFAs/omega-3 EFAs has changed from 2/1 to about 30/1 over the past 100-150 years (Lieberman & Bruning, 2005; Simopoulos, 2002; Goldman et al., 2009; Wylde, 2013).

The importance of the beneficial effects of omega-3 fatty acids and of their deficiency in diet has been demonstrated by many studies that support their role as nutrients, as well as their fundamental although short-term role, through consumption in the form of fish oil in particular, for the replacement of excessive omega-6 fatty acid amounts, which are extremely harmful (Wylde, 2013).

Action mechanisms

A number of studies in rodent models have monitored the action mechanisms of the administration of omega-3

Received: 2014, May 27; *Accepted for publication:* 2014, June 10;

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polyunsaturated fatty acids (n-3 PUFA) regarding their protective effect by:

- influencing of the oxidant/antioxidant balance indicators in the brain, the striated bodies, the hippocampus, the prefrontal cortex, the hypothalamus (Sarsilmaz et al., 2003; Songur et al., 2004; Ozyurt et al., 2007; Yu et al., 2013);
- impairment of the Na⁺K⁺ATP-ase pump in the sarcolemma (Turner et al., 2003);
- influencing of serotonergic, cannabinoid and GABAergic receptors in the hippocampus and the hypothalamus (Yu et al., 2013), of prefrontal serotonergic receptors (du Bois et al., 2006);
- influencing of cerebral neurotrophic factors in the prefrontal cortex, hippocampus and striated bodies (Gama et al., 2012);
- protection against neurodegeneration, modulation of synaptic plasticity (Kawashima et al., 2010);
- antagonizing / activation of inositol triphosphate/protein kinase signal transduction pathways (Mc Namara & Strawn, 2013);
- alteration of neurotransmission systems and of neural membrane phospholipid composition (Du Bois et al., 2005);
- influencing of astrocytes, oligodendroglia and neurons (Katz et al., 2007).

Other studies have monitored the effects of dietary omega-3 polyunsaturated fatty acid deficiency as a risk factor through the influence on dopamine, at the level of striated bodies (Bondi et al., 2014), and the impairment of synapses, neuritogenesis, mitochondrial functions, exocytosis, endocytosis, the role of clathrin (English et al., 2013).

The results obtained evidenced the beneficial protective and prophylactic role of omega-3 PUFA (Bondi et al., 2014; Gama et al., 2012; Kim et al., 2012; Ozyurt et al., 2007; Mc Namara, 2006; Horrobin et al., 2002) in schizophrenia.

Effects of omega-3 PUFA

Omega-3 fatty acids contain substances – eicosanoids, with multiple effects on the body functions (systematization according to du Bois et al., 205; Garcia-Alonso et al., 2012; Goldman et al., 2009; Horrobin et al., 2002; Lieberman & Bruning, 2005; Wylde, 2013).

- a) Cell functions
 - structure of cell membranes: affinity for phospholipids; they can replace linoleic and arachidonic acid in some phospholipids (phosphatidylcholine);
 - redistribution of n-6 PUFA from the phospholipid fraction in cholesterol esters and triglycerides;
 - activation of intracellular metabolic processes;
 - activation of antioxidant enzymes (antioxidant role);
 - intracellular communication (chemical messengers);
 - release of arachidonic acid, biosynthesis of prostaglandins and thromboxanes;
 - platelet antiaggregants;
 - inhibition of the increase in intracellular Ca²⁺ concentration;
 - inhibition of neutrophil chemotaxis;
 - antimutagen for epithelial and macrophage cells
- b) Blood effects: anticoagulant; antifibrinolytic; decrease of triglycerides; increase of HDL-cholesterol.

c) Systemic effects: hypotension; regulation of heart rate; restoration of the elasticity of arteries in the elderly; antiinflammatory, antimicrobial, antiviral effects; antiallergic effects; antitumoral effects; consolidation of the immune system.

Therapeutic uses of omega-3 fatty acids

(systematization according to Goldman et al., 2009; Lieberman & Bruning, 2005; Zamaria, 2004; Wylde, 2013)

- a) mental diseases: depression, schizophrenia, manic-depressive disorders, dyslexia, hyperactivity disorders, aggressiveness in children, behavioral disorders (Bondi et al., 2014; DeMar et al., 2006; Gama et al., 2012; McNamara & Strawn et al., 2013; Song et al., 2009);
- b) cardiovascular diseases: atherosclerosis, reduction of CVA and heart attack risk;
- c) inflammatory diseases;
- d) autoimmune diseases: herpes, multiple sclerosis;
- e) psoriasis, dermatitis, diabetes, breast cancer, colon cancer, lung cancer, arthritis, gout, allergies;
- f) weight loss.

Omega-3 fatty acids and physical exercise

Studies on omega-3 PUFA, administered to animals or human subjects, have shown contradictory effects: favorable and unfavorable (Ayre & Hulbert, 1997; Huffman et al., 2004).

Different studies have evidenced contradictory data regarding the influence of dietary supplementation with omega-3 PUFA on the O/AO balance during physical exercise in rats, some of which showing the AO effect, others the PO effect. The effect might depend on the PUFA dose, the omega-6/omega-3 ratio, and the vitamin E amount in relation to the ingested PUFA amount (Garcia-Alonso et al., 2012; Belviranlı et al., 2012).

Recent studies regarding dietary supplementation with omega-3 PUFA have demonstrated effects on the aerobic exercise capacity, serum and tissue redox homeostasis, blood lipid metabolism changes and histopathological changes in the myocardium and encephalon occurring during physical exercise (Bulduş et al., 2012). The results have shown the energogenic and antioxidant effect under exercise conditions, the increase of aerobic exercise capacity and antioxidant defense, for the improvement of performance (Bulduş et al., 2012).

Conclusions

- 1) The increased intake of omega 3 fatty acids through proper nutrition has a beneficial role, protective and preventive, for the physical and mental health.
- 2) The dietary supplementation with omega-3 fatty acids may help increase the exercise aerobic capacity and the performances.

Conflicts of interests

There are no conflicts of interest.

Acknowledgments

This paper is part of the research for the first author's doctoral thesis.

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Physiological considerations on Neuromuscular Electrical Stimulation (NMES) in muscular strength training

Considerații fiziologice asupra utilizării electrostimulării neuromusculare (ESNM) ca metodă de creștere a forței musculare

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Abstract

Neuromuscular Electrical Stimulation (NMES) is a form of electrical stimulation that uses the application of electric current through electrodes, leading to the depolarization of the motoneuron, thus eliciting a muscular contraction (stimulation over the motor threshold). Although its beneficial effects on strength training are widely recognized, some controversial aspects concerning the underlying physiological mechanisms of this strength gain still persist. This paper reviews the main aspects of motor unit recruitment in NMES versus Voluntary Muscular Contraction (VMC) and of the involvement of the Central Nervous System - through spinal and supraspinal mechanisms - in the muscle strength gain during NMES.

Key words: electrical stimulation, muscle, strength, nervous system.

Rezumat

Electrostimularea neuromusculară (ESNM) reprezintă o formă de electrostimulare care constă în aplicarea unui curent electric prin intermediul unor electrozi, ceea ce determină depolarizarea motoneuronului și la producerea contracției musculare (stimulare peste pragul motor). Deși efectele sale benefice asupra creșterii forței musculare sunt general recunoscute, persistă încă anumite controverse asupra mecanismelor fiziologice, care stau la baza acestui câștig de forță. Lucrarea de față trece în revistă principalele aspecte ale recrutării unităților motorii în cursul ESNM versus contracția musculară voluntară (CMV) și ale implicării sistemului nervos central - prin intermediul mecanismelor spinale și supraspinale - în producerea forței în cursul ESNM.

Cuvinte cheie: stimulare electrică, mușchi, forță musculară, sistem nervos.

Introduction

Neuromuscular electrical stimulation (NMES) is a form of electrical stimulation that consists of the application of electric current through electrodes, leading to motor neuron depolarization, thus eliciting a muscle contraction (stimulation is performed above the motor threshold). It has to be differentiated from other forms of electrical stimulation.

- Functional Electrical Stimulation (FES)

This method uses electrical stimulation for activating the paralyzed muscles in a sequential mode, thus assisting the performance of the ADLs (Activities of Daily Living). It is also called “neuroprosthesis” or “electric orthosis”. The level of complexity of FES can range from a dual-channel stimulation (e.g. to enhance foot dorsiflexion during gait) (Kim et al., 2004) to a multichannel FES (e.g. to activate several muscle groups to restore stance and gait

in paraplegic patients) (Karimi, 2013).

Electrical impulses can be delivered through surface electrodes (transcutaneous electrodes - placed on the area of the muscle body or on motor points) or through fully implanted electrodes (“cuffs” of peripheral nerves or nerve roots) powered and controlled by radio-frequency from an external unit (Iliescu et al., 2010).

- Transcutaneous Electrical Nervous Stimulation (TENS)

It is a non-invasive analgesic technique that is used for the symptomatic treatment of acute and non-malignant chronic pain (low back pain, arthritic pain including osteoarthritis and rheumatoid arthritis, myofascial, neuropathic, postoperative, orofacial pain, etc.) (Barlas & Lundeborg, 2005). It is also used as a palliative method in metastatic bone disease and neoplasms (Berkovitch & Waller, 2005; Stannard, 2002). The analgesic effect of TENS can be explained by the “gate control theory”

Received: 2014, May 5; Accepted for publication: 2014, May 22;

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proposed by Melzack & Wall (1965).

- *Threshold Electrical Stimulation (TES)*

This method was initially developed as a pediatric protocol for neuromuscular stimulation; it produces a stimulation at the sensory threshold (low intensities of 2-10 mA), for long periods of time (e.g. overnight for 8-12 hours, 6 nights a week). Although the promoters of this method assert its role in the reeducation of the paralyzed muscle, the results are inconclusive (Pape, 1997; Dali et al. 2002).

Fields of application

If NMES was first conceived to treat muscle atrophy as a result of immobilization or denervation, for the initiation of the natural biological reinnervation process, this method has been taken into account as a training tool of the normally innervated, weak muscle for almost 30 years (Jackson & Seddon, 1945). For about 20 years it has been largely adopted.

Despite its long time utilization, NMES has received increasing attention in the last years, due to its capability to serve as (Maffiuletti et al., 2010):

1. a strength training tool (healthy subjects and athletes), since its chronic utilization may induce neuromuscular adaptations similar/complementary to those induced by voluntary strength training;
2. a rehabilitation/preventive instrument in completely/partially immobilized patients, since its chronic use may preserve muscle mass and function during periods of inactivity;
3. a testing tool for the assessment of muscular and neural function based on the possibility to induce standardized muscular contractions whose electrical (electromyography-EMG) and mechanical (torque) properties could be easily measured;
4. a post-exercise recovery tool for athletes, since its acute application may increase blood flow, thus accelerating metabolite washout (Babault et al., 2011).

NMES as a rehabilitation tool or as a muscle strength training method is used in many medical fields: *orthopedic medicine*: anterior cruciate ligament reconstruction (Taradaj et al., 2013), fractures (Galkowski et al., 2009), knee osteoarthritis (Elboim-Gabyzon & Rozen, 2013), rheumatoid arthritis (Piva & Goodnite, 2007), total knee arthroplasty (Pettersen & Snyder-Mackler, 2006), total hip arthroplasty (Suetta & Aagaard, 2004), patellofemoral syndrome (Callaghan & Oldham, 2001); *neurology*: promoting voluntary control (Lin & Yan, 2011), reducing muscle spasticity (Bakhtiary & Fatemy, 2008), improving muscle strength (wrist extensors, knee extensors, foot dorsiflexors) (Rosewilliam et al., 2012), reducing shoulder subluxation after stroke (Ada & Foongchomcheay, 2002); *general medicine*: patients with hemophilia (Querol & Gallach, 2006), cancer (Crevenna et al., 2006), critically ill patients (Gerovasili et al., 2009); *geriatric medicine*: (Amiridis et al., 2005); *space medicine*: astronauts (Carpenter et al., 2010), simulated microgravity (Duvoisin et al., 1989); *sports medicine*: healthy athletes, sport injuries (individual or team sports) (Maffiuletti et al., 2006); *cardiovascular and pulmonary medicine* (improvement of exercise capacity, peripheral muscle strength training in patients with heart failure and chronic obstructive pulmonary disease) (Dumitru et al., 2013; Smart et al., 2012; Sbruzzi et al., 2010).

Physiological principles in NMES

Although NMES's capability to improve (healthy and dysfunctional) muscle performance is nowadays widely accepted and adequately demonstrated, some controversial aspects concerning the underlying physiological mechanisms of strength gain in NMES versus voluntary contraction still persist.

a) Motor unit recruitment

Neurophysiological studies have demonstrated the existence of two types of motor units - large ("fast") and small ("slow"), having different characteristics in terms of excitability, contractility and resistance to fatigue.

The motor unit - the smallest neuromuscular functional unit, was described in 1925 by Liddell and Sherrington. It represents a neuromuscular complex comprising the motor neuron body, its dendrites and axon, together with all the muscle fibers that it stimulates (Sbenghe, 2002).

The differences between the two types of motor units are described in Table I.

Table I
Motor unit types and their characteristics.

Large ("fast") motor units	Small ("slow") motor units
- Large diameter axons	- Small diameter axons
- Fast-twitch fibers	- Slow-twitch fibers
- Low resistance to fatigue	- High resistance to fatigue
- Low excitability threshold	- High excitability threshold

Due to their lower excitability threshold, the fast (*large*) motor units are more easily depolarized than are the slow (*small*) ones, thus fast motor units would be preferentially activated by the NMES current.

It was thought for a long time that NMES initially activates the large motor units (i.e. with the lowest threshold of depolarization); then, at increasing current intensities, the small motor units are also activated, which represents a reversal of Henneman's principle (known as the "size" principle).

Henneman's principle (the "size" principle) states that during a voluntary muscle contraction, the recruitment order of motor units moves from small, slow-twitch motor units to large, fast-twitch ones. (Figure 1) (Henneman et al., 1965).

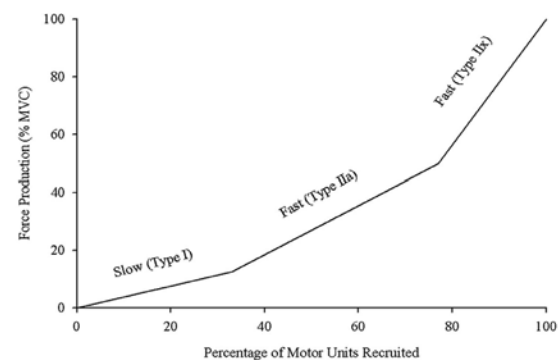


Fig. 1 – Graphic representation of the recruitment order during voluntary contraction of skeletal muscle (by Henneman et al., 1965).

For a long time, the rule of the reversal of the "size" principle of Henneman in NMES versus voluntary

muscle contraction was generally accepted. Two neurophysiological findings are commonly cited to support this fact:

- the axons of large motor units have a lower resistance to the electric current and conduct the action potential more rapidly than the axons of small motor units;
- data demonstrating an early onset and rapid increase in muscle fatigue (a characteristic of large motor units) during NMES compared with voluntary contraction.

Two aspects should be pointed out regarding motor unit recruitment during NMES:

- the "preferential recruitment" of motor units with NMES is only valid during direct motor nerve stimulation (in vivo/in situ); in clinical practice, we generally use surface electrodes; in this case, the muscle response to NMES is different (Gregory & Scott Bickel, 2005).
- although the preliminary studies which confirm the reversal of Henneman's principle in NMES are well-designed, they are based on research on lower mammals. Therefore, their results cannot be directly extrapolated to human subjects.

The participation of motor units in the NMES-induced contraction is different from that underlying voluntary muscle activation.

The first logical difference refers to *temporal recruitment*, which is asynchronous during voluntary contraction (in untrained subjects) and synchronous (demanded by the electrical stimulator) during NMES (Adams & Harris, 1993).

With regard to *spatial recruitment* (in vivo, using surface electrodes), it has been demonstrated that the variable distribution of the motor axonal branches in a non-uniform electric field (in which the current density decreases with depth) is more important than their excitability threshold (in other words, than the size of motor units) in NMES muscle response.

For that reason, in NMES, motor unit recruitment is *non-selective, random*, with no precise order related to the type or size of the motor units. In other terms, in NMES, spatial recruitment is *disorderly*, implying the activation of some large ("fast") motor units, in addition to small ("slow") ones, even at relatively low force levels (Jubeau et al., 2008; Gregory & Scott Bickel, 2005).

At constant intensities, NMES induces a continuous contractile activity in the same population of superficial muscle fibers, namely those with the axonal branches in proximity to the stimulating electrode. Therefore, spatial recruitment is *fixed*, which means that the same motor

units are repeatedly activated by the same amount of electric current; the recruitment decreases proportionally to the increasing distance from the electrode.

With increasing intensities, new muscle fibers located at a greater distance from the electrode ("deep" fibers) are activated, while superficial ones maintain their contractile activity (Theurel et al., 2007; Zory et al., 2005).

The characteristics of motor unit recruitment in voluntary contraction and NMES are presented in Table II.

The characteristics of motor unit recruitment in NMES bring not only disadvantages imposed by the early onset of muscle fatigue, but also several clinical benefits, with practical applicability.

The advantages of NMES use

Irrespective of their type ("slow" or "fast"), muscle fibers can be selectively activated at relatively low current intensities. This NMES feature can be used in:

- elderly individuals (presenting a selective atrophy of type II muscle fibers)
- patients with Chronic Obstructive Pulmonary Disease (COPD) or Chronic Heart Failure (CHF) (also with selective atrophy of type II muscle fibers) (Gosker et al., 2002; Kanda et al., 2001)
- orthopedic patients – who cannot perform voluntary contractions at high intensity levels (these high levels imply the activation of type II muscle fibers) (Stevens et al., 2004).

NMES has the capability to activate the "fast" muscle fibers (type II fibers) that are not typically recruited during the ADLs (Activities of Daily Living); these fibers can only be recruited during high-force voluntary contractions. The effect is an *improvement of muscle deconditioning syndrome*.

Disadvantages of NMES use

The main result of this specific motor unit recruitment pattern for NMES is the high metabolic cost of an electrically-evoked contraction (Vanderthommen et al., 2003); compared to a voluntary contraction at the same intensity (measured as percent of maximal voluntary contraction - % MVC), NMES-induced contractions generate an earlier occurrence and higher levels of muscle fatigue (Deley et al., 2006).

The spatially fixed recruitment in NMES entails that the same motor units are repeatedly activated by the same amount of electric current, therefore muscle fatigue occurs rapidly in such fiber type recruitment patterns (Gondin et al., 2011). On the contrary, during voluntary contractions, the recruitment patterns can be alternate, allowing a

Table II

Motor unit recruitment in voluntary contraction *versus* NMES.

Voluntary contraction	NMES
- asynchronous	Temporal recruitment - synchronous
- dispersed	Spatial recruitment - superficial (close to the electrode)
- rotation is possible	- spatially fixed
- almost complete	- incomplete (even at maximum)
- orderly, selective ("slow units" to "fast" units)	Recruitment sequence - disorderly/non-selective/random ("slow" and "fast" units)
- fatigue	Effects (consequences) - early onset of increased fatigue

recruitment of additional motor units, when fibers that were first activated become fatigued (during NMES, such recruitment pattern changes are not possible). Moreover, during voluntary contraction, muscle strength can also be maintained by increasing the firing rates of active motor units (the so-called "temporal summation") (Carpentier et al., 2001).

The differences between the two aforementioned contraction modalities (voluntary and NMES-induced) regarding the recruitment patterns of muscle fibers and the metabolic demand represent an argument for the *non-concomitant combination* of these two training techniques (Vanderthommen & Duchateau, 2007).

b) Nervous system adaptations during NMES

Although NMES has been usually considered a technique producing muscular contractions with an important contribution of the central nervous system, there are some elements that demonstrate a noticeable involvement of various neural structures in strength gain during NMES application.

In the last years, growing scientific evidence has confirmed these "central effects" of NMES. We can even talk about a "multimodal bombardment" of the central nervous system during NMES (Baker et al., 2000), which results in increased cortical activity and in spinal motoneuron recruitment, as well.

Spinal recruitment

The application of NMES generates, on the one hand, the depolarization of the motor axonal branches (the direct way = the peripheral way) and on the other hand, the depolarization of the sensitive axonal branches situated under the stimulation electrode.

In this way, NMES generates an afferent discharge (via sensory axons) to the spinal cord, which in turn induces the reflexive recruitment of spinal motoneurons (the reflexive pathway = the central pathway). This reflexive depolarization of the motoneurons along with their direct depolarization provides an additional strength gain in NMES muscle training (Collins et al., 2007).

The contribution of the "central pathways" to the NMES-induced contraction has been confirmed by experiments that use an anesthetic block of the peripheral nerves, proximal to the stimulation site. In these experiments, the same amount of electric current and the same stimulation pattern produced significantly greater force (torque) *before* the anesthetic block (situation that involves the participation of the central nervous system) compared with muscle strength (torque) *after* the anesthetic block. In the latter situation, the afferent discharge to the spinal cord is blocked, therefore only the direct activation of motor axons could contribute to the muscle contraction (Lagerquist & Collins, 2010).

In order to enhance the reflexive spinal recruitment during NMES, the following stimulation parameters have been suggested:

- *low pulse amplitudes* of NMES (low current intensities) – the goal is to minimize the antidromic block, which is the collision between the action potential running antidromically along the motor axons and those generated after the reflexive recruitment of spinal motoneurons

- *pulse duration between 0.2-1 ms* (to maximize the activation of sensory/afferent axons that have a longer strength-duration time constant and a lower rheobase than motor axons)

- *stimulation train duration*

- below 2 seconds for stimulation "over the nerve"

- above 2 seconds for stimulation "over the muscle"

- high frequencies (50-100 Hz) to increase the rate at which the afferent/sensory volley is sent to the spinal cord and the supraspinal centers.

Because of these characteristics of the electrical stimulation impulses, this NMES pattern is known as "wide-pulse high-frequency" neuromuscular electrical stimulation (NMES).

The reflexive recruitment (through central pathway) of spinal motoneurons during NMES is more "physiological": more orderly, less synchronous and more spatially diffuse through the muscle.

It has been suggested that these stimulation characteristics could be used to diminish some limitations/disadvantages of NMES, especially those related to discomfort and random recruitment (Berquist et al., 2011).

As previously mentioned, the disorderly, superficial, spatially fixed and incomplete motor unit recruitment during NMES generates some limitations/disadvantages of this muscular training method. Nevertheless, there are some strategies that are able to enhance the spatial recruitment of motor units in the context of muscular strengthening (Maffiuletti, 2010).

I. The *stimulation current intensity* should be increased as often as possible (by the users themselves), after each muscular contraction; the reason is to stimulate more and more muscle fibers, situated in deeper muscle zones.

II. The *stimulation electrodes' position* has to be changed after a series of contractions (during and between NMES sessions), in order to alternate the superficial fibers preferentially stimulated by the electrical current.

III. The *length of the stimulated muscle* must be changed by alternating the joint angle, to vary the position of muscle fibers in relation to the electrode and to modify the presumable contribution of cutaneous and joint receptors to the evoked muscular contraction.

Supraspinal adaptations

Besides the depolarization of the motor neurons' axons situated beneath the stimulation electrode, NMES also stimulates the sensory neurons' axons, generating ascending action potentials to the sensory-motor cortex. The last years research, using functional magnetic resonance imaging (fMRI) (Blickenstorfer et al., 2009; Han et al., 2003), transcranial magnetic brain stimulation (TMS) (Everaert et al., 2010) or Near Infrared Spectroscopy (NIR spectroscopy) (Jang et al., 2014), provides strong evidence regarding the cortical adaptations involved in muscle strength gain by NMES.

Studies using fMRI have demonstrated an acute increase in the hemodynamic response in the sensorimotor cortex, also showing a dose-response relationship between the current intensity and cortical activity (Smith et al., 2003). This allows speculations that high current intensities would increase the supraspinal effects of NMES-induced

muscle contractions.

There are strong lines of evidence demonstrating the neural adaptations induced by short-term NMES training programs on the healthy or affected muscle. These adaptations refer to:

- significant increases in maximal voluntary contraction (MVC) strength after only a few sessions of NMES (Brocherie et al., 2005), when there is no reason to imagine muscular hypertrophy induced by increased protein synthesis;

- strength gains without any noticeable changes in muscle enzyme activity, muscle fiber size, mitochondrial properties (Eriksson et al., 1981);

- increase in voluntary muscle activation as shown by surface electromyography (Gondin et al., 2006);

- the voluntary strength gain of the untrained, homologous muscle of the contralateral limb, after unilateral muscle training ("cross educational effect"), represents perhaps the strongest evidence for neural adaptations related to NMES (Hortobagyi et al., 1999; Bezerra et al., 2009; Farthing, 2009).

Based on these above-mentioned considerations, it has been assumed that NMES at high current doses would mostly induce *supraspinal* neural adaptations, while "*wide-pulse high-frequency*" NMES would favor *spinal* adaptations. In the same way, high doses of NMES would hypothetically activate both (slow and fast) fiber types, whereas "*wide-pulse high-frequency*" NMES mainly targets the slow muscle fiber population.

Conclusions

1. A good understanding of the physiological mechanisms by which NMES produces muscle strength gain would allow the optimization of NMES applications in clinical settings, research or sport training.

2. The different muscular and neural adaptations induced by NMES could be specifically "*targeted*" during muscle strength training, according to the individual patient's/ athlete's needs.

3. Further studies are needed in order to confirm the hypothesis that NMES represents, beyond a familiar *muscular* training method, an efficient training technique, based on mechanisms that imply the *nervous system's* involvement.

Conflicts of interests

There are no conflicts of interest.

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Principles of postoperative breast cancer rehabilitation

Principii de reabilitare postoperatorie in neoplasmul mamar

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Abstract

Breast cancer is the oncologic pathology with the highest incidence rate among women in Romania. These incidence rates have increased in most countries of the world over the last decades, most rapidly in developing countries, and are expected to increase even further. However, the mortality rate has stagnated at 60-70% over the past 20 years. Globally, this pathology ranks number 1 among the causes of cancer deaths in women and number 5 overall. It is compulsory that the malignancy of the pathology is established prior to treatment in order for discussions regarding the tests required for establishing the pretreatment and therapy alternatives to be possible. Similarly to other therapy options (surgery, chemotherapy, radiotherapy, hormone therapy, targeted therapy, etc.), medical rehabilitation plays an important role in establishing the patient's body function and quality of life.

Key words: breast cancer, medical rehabilitation, quality of life.

Rezumat

În România ca incidență, neoplasmul mamar reprezintă prima patologie oncologică feminină. Incidența a crescut în majoritatea țărilor din întreaga lume în ultimele decenii, creșterea cea mai rapidă fiind înregistrată în țările în curs de dezvoltare. Tendința este de continuă creștere, fără modificarea mortalității, care se menține constantă în ultimii 20 ani, la circa 60-70%. Această patologie reprezintă cea mai frecventă cauză de deces datorată cancerului, pentru sexul feminin, la nivel mondial și pe locul 5 pentru ambele sexe combinate. Stabilirea diagnosticului de malignitate este obligatorie înainte de începerea tratamentului, pentru a putea discuta cu pacienta investigațiile necesare stabilirii bilanțului preterapeutic și alternativele terapeutice existente. Reabilitarea medicală ocupă un loc important, alături de celelalte mijloace terapeutice (intervenția chirurgicală, chimioterapia, radioterapia, hormonoterapia, terapia țintită etc.), având rol asupra funcționalității întregului organism, dar și asupra calității vieții.

Cuvinte cheie: neoplasmul mamar, reabilitare medicală, calitatea vieții.

Introduction

Breast cancer is a major public health issue. However, it is usually diagnosed when already at an advanced stage.

The mortality rate can be lowered in developed countries through mammography screening so long as there is an infrastructure, funds and possibilities to allow the enforcement of specialty treatment. Such a program and good compliance with treatment can lower the mortality rate by up to 20% in women aged over 50 (Ferlay et al., 2010).

Epidemiology

The incidence of breast cancer

In Romania, the incidence of breast cancer has increased from 25/100,000 women in 1988 to 50.56/100,000 in 2006. In 1960, 6.9% of all malignant tumors in women resulted in breast cancer. The incidence rate increased to 13.5% by

1978 and to 22.61% by 1996. Thus, breast cancer became the main oncologic pathology in women (Ferlay et al., 2010; Anghel et al., 2009).

The incidence rate is lower in men than in women, the disease usually occurring around the age of 71. In men, the disease is usually diagnosed at a more advanced stage. In 42% of cases, diagnosis is made at stage III or IV (Giordano et al., 2004; Rossman et al., 2007; Contractor et al., 2008; Anderson et al., 2010).

The mortality rate increased from 11.2/100,000 in women in 1960 to 23.88/100,000 in 2006 and currently ranks number 1 among the causes of cancer deaths in women and number 5 overall. In Romania, it is the most frequently encountered malignant tumor in women with approximately 4,200 new cases and 2,500 deaths registered every year. The numbers are expected to increase even further, but it must be noted that the mortality rate has stagnated at 60-70% over the past 20 years (Ferlay et al.,

Received: 2014, April 28; Accepted for publication: 2014, May 15;

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2010; Anghel et al., 2009; Giordano et al., 2004; Rossman et al., 2007; Contractor et al., 2008; Anderson et al., 2010).

The course of treatment is established based on the stage of the disease and the associated defects and it can consist of one or a combination of the following methods: surgery, chemotherapy, radiotherapy, hormone therapy, targeted therapy, medical rehabilitation, etc.

Postoperative management

It is very important that the therapist makes contact with the patient shortly after surgery in order for the latter to acquire the self care steps as rapidly as possible.

Such surgical interventions are associated with short hospitalization times, so the therapist should make contact with the patient the following day and highlight the importance of preventing complications, disabilities and postoperative function limitations (lung complications, upper limb lymphedema, mobility impairment, etc.).

The patient must conduct physical exercise at a moderate pace, preserve their energy and avoid fatigue, especially if undergoing chemotherapy or radiotherapy.

The patient must conduct physical exercise at moderate intensities without experiencing pain at the level of the affected upper limb. The routine must be adjusted to the chemotherapy programs, an increase in pace being possible only after cessation of chemotherapy.

Postoperative complications that require rehabilitation techniques:

- Immediate or late blood flow or lung complications
- Upper limb lymphedema
- Upper extremity mobility impairment
- Defective posture alignment
- Reduced muscle strength and function of the upper extremity
- Fatigue and low physical endurance
- Emotional and social adaptation difficulties

Nursing plan - Methods used

1. Preparation of the patient for postoperative auto-management: Interdisciplinary education regarding all aspects of emotional and physical deterioration.

2. Prevention of postoperative lung complications and thromboembolism: Preoperative or postoperative preparation regarding deep breathing with special emphasis on maximum inspiratory flows and efficient coughing. Flexion exercises for the lower limb.

3. Prevention of lymphedema or postoperative minimization of this risk: Elevation of affected extremities on pillows (at a 30-degree angle) while the patient sits on a bed or chair. Application of bandages around the affected arm or application of elastic compression bandages. Elevation of affected arm. Exercises designed to increase the amplitude of movement. Avoidance of upper limb immobilization.

4. Reduction of the degree of lymphedema if or when it occurs: Daily use of the pneumatic compression pump followed by wrapping of the upper limb. Permanent elevation of the entire upper limb when the patient is at ease. Continuous wrapping of the upper limb in non-elastic or partially elastic compression bandages (whether the patient is active or at ease). Manual lymphatic drainage

massage. Daily routines for lymphedema reduction. Use of compression bandages after the routine for lymphedema reduction and stabilization. Careful nursing of the tegument.

5. Prevention of posture deformation: Preparation regarding the correct position in bed with the central and symmetrical positioning of the shoulders in relation to the trunk prior to surgery or on the same day. Posture acknowledgement training: Encouraging the patient to adopt a correct position in order to avoid an abnormal shoulder position. Posture exercises with a focus on scapular retraction exercises.

6. Prevention of blood pressure and cervical muscle contraction or retraction: Exercises designed to increase the amplitude of movement in the cervical area and relaxation. Shoulder elevation and rotation exercises. Soft massage at the level of the cervical muscles.

7. Prevention of joint stiffness in the upper extremity: Exercises designed to increase the amplitude of movement at the level of the shoulders, elbows and hands. The routine must be initiated as soon after surgery as possible. It can also be initiated in the presence of drainage tubes, but maximum attention is required. Once the incision has healed, stretching exercises can be conducted at shoulder level.

8. Recovery of muscle strength and upper limb function: Low-intensity isometric exercises at shoulder level initiated on postoperative day 1 or 2. Resistance exercises conducted with lightweights or partially elastic materials which act on the scapular or glenohumeral muscles. Scapular or glenohumeral stabilization through exercises conducted in orthostatic position, hands pressed against the wall or table. Use of affected limb for low-intensity daily activities.

9. Increase in effort tolerance, well-being and thus fatigue reduction: Low-intensity aerobic exercises such as aerobics or gait.

10. Provision of information regarding the patient's resources, provision of support from the family and their continuous education.

Precautions: The shoulder exercises must be conducted at an elevation angle of up to 90 degrees until after the removal of the drainage tubes. The stitches and incisions must be monitored carefully during exercise. The difficulty of exercises must be increased gradually and very slowly, especially if the patient undergoes adjuvant therapy (Silver, 2007; Harris et al., 2012).

Objectives of the medical rehabilitation program

- The correction of functional deficiencies signaled during ADL (activities of daily living) – driving, sleeping, child care, posture deformation correction.

- In the short run, a significant reduction of the motor area of the shoulder can be identified after a period of 2-3 months after mastectomy (Goselink et al., 2003). In the long run, a reduction of the motor area of the shoulder can occur in 28% of cases 1 year after mastectomy (Blomqvist et al., 2004). Also, a significant decrease in muscle strength required for shoulder flexion and abduction can be identified 15 months after mastectomy (Blomqvist et al., 2004).

A recent prospective study has revealed the importance of postoperative clinical assessment and careful monitoring for the identification and treatment of UQD (upper quarter dysfunction). A clinical assessment of the ROM (range of motion), muscle strength in both upper limbs, volume and circumference is recommended in 94 patients recently diagnosed with breast cancer (stages I-III) prior to surgery and 1, 3, 6 and 12 months after surgery. All participants in the study underwent a physical exercise and medical education program. The clinical assessment conducted within 1 month after surgery revealed that the ROM, muscle strength and function had decreased significantly after surgery. However, most of the patients who followed this program achieved the reference (preoperative) values within 1 year (Springer et al., 2010).

Clinical guideline recommendations for the upper limb

The function of both upper limbs must be evaluated prior to surgery in order to have a point of comparison. Kinetotherapy must be initiated on postoperative day 1. A mild routine should be conducted starting with postoperative week 1. Active exercises can be initiated 1 week after surgery, once the drainage tubes have been removed. It is recommended that they be continued for a period of 6-8 weeks until the full range of motion of the upper limb has been restored. The patient must be trained to massage the scarred area herself. The postoperative clinical assessment should be regulated within a year after surgery (Harris et al., 2012).

Progressive resistance exercises can be conducted using lightweights (0.5-1 kg) between postoperative weeks 4 and 6. It is important to provide careful nursing, proper hygiene of the upper limb, and avoid trauma in order to minimize the risk of infection and lymphedema.

It is important for the patient to maintain an optimal level of activity after surgery, initiate a resistance exercise routine and conduct average-intensity exercises for 30 minutes on a number of days per week. This routine should also include kinetotherapy and occupational therapy. The physical routine must be established according to the patient's gender, age and type of cancer, among others. Also, the intensity and duration of the exercises should be set low initially and then increased gradually.

Studies have also revealed that physical exercise lowers the risk of femoral neck fracture, probably by lowering the risk of falls. However, it has a low effect in terms of mineral bone density preservation. The routine must be conducted on a daily basis with at least 30 minutes of moderate physical activity included. Tai chi, physical therapy and dancing are considered good options to improve balance and prevent falls.

A nutritionist must be consulted for weight management.

Injections, vaccines and venous punctures in the upper limb homolateral to the axillary dissection are contraindicated (Harris et al., 2012).

Electrotherapy: LASER (light amplification by stimulated emission of radiation) treatment, electric stimulation, microwaves and thermotherapy are not recommended during this period. This is not because of

proven side effects but because of the insufficiency of clinical data to support their use. Ultrasound therapy is also contraindicated in the proximity of areas presenting with possible metastases in patients with a breast cancer history (Harris et al., 2012).

Hydrotherapy is a comprehensive approach to physical exercise in water designed to increase strength, flexibility, resistance, blood flow and muscle relaxation. Studies have demonstrated that physical activity is mainly associated with an improved quality of life at both physical and functional levels. A combination between physical activity and cognitive-behavioral therapy can determine a significant improvement in the patient's quality of life. The results of the physical exercise programs become visible within a short period of time after the initiation of the program. In the long run, better results can be obtained by combining physical exercise and psychological therapy. A comparative study demonstrated the long-term benefits of physical exercise on the well-being of breast cancer patients as well as the beneficial effects of a program that combines physical exercise and cognitive-behavioral therapy (May et al., 2009). Two different studies emphasized the importance of long-term physical exercise in improving the quality of life of breast cancer patients. The studies conducted by Milne et al. (2008) revealed a significant improvement in the quality of life of the participants after following a 12-week program consisting of combined aerobic and resistance exercises. Daley et al. (2007) highlighted the beneficial effect of an 8-week program involving regular physical exercise on breast cancer patients. A significant improvement in their overall mobility could be noticed upon every assessment.

Pain management: The main objective is to identify the cause and treat it whenever possible. The top priority of any treatment is to achieve full pain management within a short period of time. The second priority is to prevent its recurrence. Patients must be informed about pain management and their active role within this type of management. At the same time, the treatment should be selected according to the associated defects, the response to treatment, etc. The development of a comprehensive, effective pain management plan presupposes the education and involvement of the patient and family, along with an interdisciplinary team approach.

Pain management can be achieved through both pharmacological and non-pharmacological methods. These include bed, bath and walking supports, positioning training, energy conservation, activity pacing, TENS (transcutaneous electrical nerve stimulation), DDC (diadynamic current), acupuncture or acupressure (Harris et al., 2012).

Chemotherapy can trigger the development of peripheral neuropathies. According to various studies, TENS, acupuncture, kinetotherapy, occupational therapy, therapeutic interventions and medical education can all be used in these cases (Harris et al., 2012).

Chemotherapy can lead to cardiotoxicity, which is one of the possible side effects. This causes modifications in the kinetotherapy program by reducing the patient's effort tolerance.

Assessment and diagnosis of the upper limb lymphedema

An early diagnosis is compulsory. To this end, measurements are made at the level of both upper limbs prior to and after surgery.

The circumference is measured in four points: the metacarpophalangeal joint, the radiocarpal joint, 10 cm distal to the lateral epicondyle and 12 cm proximal to the lateral epicondyle.

Physicians should indicate any weight problem, edema or sensation of constriction present at the level of the affected upper limb. Any difference exceeding 2 cm in the above mentioned points can justify the initiation of specific treatment once the possibility of the development of other diseases has been excluded. These can include axillary tumors, brachial plexus tumors, bloodstream infections or venous thrombosis.

The compression devices must be worn throughout the entire day every day.

Compression bandages should be worn during exercise. This presupposes a systematic application of short-stretch bandages with various types of padding. Complex physical therapy, manual lymphatic drainage, compression and massage therapy are associated with volume reductions. A randomized trial has demonstrated that pneumatic compression pumps are increasingly preferred to no treatment. Further randomized trials are required to determine whether pneumatic compression provides additional benefits over compression garments alone (Harris et al., 2012).

The treatment option recommended for lymphedema is complete decongestive therapy, also known as complex decongestive physiotherapy and complex physical therapy. There is some evidence that compression therapy and manual lymphatic drainage can help with this condition, but further studies are needed. There is no current evidence to support the use of medical therapies, including diuretics, benzopyrones or selenium compounds. It is also recommended that patients be encouraged to consider practical advice regarding skin care, exercise and body weight.

Immediate attention to signs of infection and prompt initiation of antibiotic therapy are critical to the prevention of sepsis. The risk of infection must be reduced in order for the risks of lymphedema development or exacerbation to decrease as well. Conservative surgical and radiation treatment should be used to lower the risk of secondary lymphedema (Harris et al., 2012).

Axillary dissection minimization, the prevention of infection and avoidance of overweight also play a role in the prevention of lymphedema.

Recent (randomized and controlled) trials have demonstrated that upper limb exercises do not influence the occurrence or increase in volume of lymphedemas (Sagen et al., 2009). The intense activity of the upper limb affected after surgery or axillary dissection does not appear to have any influence on their development or occurrence (Aaronson et al., 2010; Daley et al., 2006; Milne et al., 2008; May et al., 2009; Bavaria, 2006).

A recent study conducted by Torres Lacomba et al.

compared the benefits of medical rehabilitation associated with medical education initiated between postoperative days 3 and 5 and those of medical education alone. The medical rehabilitation techniques included manual lymphatic drainage, stretching exercises, resistance exercises and the treatment of axillary web syndrome (AWS), in the event of its occurrence. The study revealed a tight connection between the axillary web syndrome, the increased risk of lymphedema and the possibility to prevent it through the early initiation of recovery therapy. Research is still being conducted at present to identify the therapy components that can treat postoperative complications and the benefits of manual therapy in the immediate postoperative period (Torres-Lacomba et al., 2010). As regards the specific treatments against breast cancer lymphedema, physical exercise and complete decongestive therapy (CDT) determine a significant increase in the patient's quality of life. For years, patients exposed to a high risk of lymphedema have been advised to avoid vigorous exercise. Five level I and II trials refute this contention. Importantly, no studies have focused on new therapies such as micro-lymphatic bypass and lymph node transfer despite the increasingly frequent application of these procedures. In conclusion, breast cancer-related lymphedema (BCRL) has a significant impact on the health-related quality of life (HRQOL) of breast cancer survivors and it is an important consideration with the axillary lymph node dissection (ALND) in patients with early-stage breast cancer. Although research on lymphedema has gained momentum recently, additional level I and II studies are required. These studies will help promote therapeutic innovation, provide support for newly developed treatment options such as microsurgical bypass or lymph node transfer and shape health care policy (Pusic et al., 2012).

The quality of life is determined by the individuals' perception of their social status within the context of the cultural values they live by and their dependency on their own needs, standards and aspirations (OMS, 1998).

Revicki & Kaplan (1993) propose a utility-based definition. According to it, the quality of life reflects the preferences for certain health states which allow improvements in the morbidity and mortality rates and it is expressed through a single ponderal index - years of life standardized according to the quality of life.

Instruments for measuring the quality of life:

- Functional Assessment of Cancer Treatment (FACT)
- Cancer Rehabilitation Evaluation System (CARES)
- Visual Analog Scale Global Quality of Life (VASQOL)
- Sickness Impact Profile (SIP)
- Nottingham Health Profile (NHR)
- Medical Outcomes Study Short Form 36 (SF-36)
- European Organization for Research and Treatment of Cancer (EORTC) modular questionnaire
- Rotterdam Symptom Checklist (RSCL)

Physical medicine and rehabilitation programs improve the quality of life by reducing fatigue, increasing physical functionality and improving pain or dyspnea.

How does pain affect the quality of life?

- By affecting the appetite, sleep and other physical

functions

- By affecting the memory and concentration skills
- By affecting the work capacity
- By reducing the sexual appetite or creating other barriers in private life
- By aggravating the daily chores (e.g. house chores, child care)
- By limiting the social activities and commitments
- By causing reductions in the family revenue
- By altering the patient's spiritual nature (fear of death)
- By causing the patient to lose their autonomy
- By isolating the patient within the family, at their workplace and in social contexts (May et al., 2009).

The cancer-specific instruments include the Functional Assessment of Chronic Illness Therapy-Spiritual Well Being Scale (FACIT-SP), the Quality of Life-Cancer Survivor (QOL-CS), the Ferrans and Powers' Quality of Life Index-Cancer Version (QLI-CV), the Quality of Life in Adult Cancer Survivors Scale (QLACS), the Cancer Rehabilitation Evaluation System Cancer-Short Form (CARES-SF), the European Organization for Research and Treatment of Cancer (EORTC QLQ-C30), the Assessment of Cancer Therapy-General (FACT-G) and the Body Image and Relationships Scale (BIRS). The breast cancer-specific instruments mostly used along with cancer-specific instruments include the European Organization for Research and Treatment of Cancer-Breast Module (EORTC QLQ-BR23) and the Functional Assessment of Cancer Therapy-Breast (FACT-B). The instruments must have good psychometric characteristics. These include precision, validity, but also sensitivity, which plays an important role in the alteration of the quality of life over time. This can undergo modifications from one year to another, depending on the patient's perceptions, expectations and health status. The generic instruments provide insight into the complete spectrum of the disease and are useful not only in comparing the QOL (quality of life) changes across different populations (for example, patients undergoing breast cancer treatment, patients with metastatic breast cancer and breast cancer survivors), but also across different diseases (for example, comparing BCS –breast cancer survivors – with ovarian or cervical cancer survivors). The survival rate and duration have increased due to the medical progress achieved, but the toxicity and side effects of specific treatments have persisted and affected the quality of life of patients.

Studies have highlighted the stringent need to emphasize and monitor the prolonged side effects of the neoplasm itself and specific treatment associated with it in order to find patient-centered solutions. Ferrel et al. have demonstrated that the psychological, social, physical and spiritual aspects of the quality of life are essential for understanding the long-term effects of the impact of breast cancer diagnosis and treatment (Chopra & Kamal, 2012; Stanton et al., 2005; Crespi et al., 2008).

Physical concerns such as sexuality and menopausal symptoms impact both psychological and social aspects of the QOL. Social concerns including self-perception changes and physical concerns negatively impact the patients' psychological well-being. Spiritual well-being

helps to improve their physical, psychological and social well-being by providing them with the strength they need to cope with the negative effects of breast cancer and its treatment (Kiecolt-Glaser, 2014; Phillips & McAuley, 2014).

Fatigue, pain, insomnia, depression, anxiety and fear of recurrence persist as preoccupations among patients and can affect their activities of daily living as well as social life.

The results of studies have varied depending on the demographic and medical variables. For example, Hispanic women experience a higher degree of insecurity as compared to that experienced by other women in other ethnic groups (Stover et al., 2014). The results have also varied depending on the type of treatment selected. Thus, lymphedema is a complication frequently associated with mastectomies, whereas fatigue and pain are frequently encountered in patients undergoing chemotherapy (Chopra & Kamal, 2012; Stanton et al., 2005; Crespi et al., 2008).

Another analysis was conducted to identify and examine the published studies on the health-related quality of life in patients presenting with breast cancer-related lymphedema. 8 of the 39 publications that met the inclusion criteria provided level I evidence and 14 of them provided level II evidence. The majority of the studies revealed a decrease in the quality of life in patients with lymphedema, with the body image and physical, psychological and social functions being the most affected. It was also observed that the patient's age, body weight and race are variables that play an essential role in their clinical decision-making process and education. With early-stage breast cancer patients fighting the decision whether to undergo the dissection of axillary lymphatic ganglions, it is important that they are aware of the risk of lymphedema as well as of the impact the procedure will have on their quality of life. For example, overweight women are exposed to a higher risk of lymphedema and their quality of life is also due to be affected to a greater extent (Pusic et al., 2012).

Conclusions

1. It has been demonstrated that medical rehabilitation does not affect the evolution of breast cancer and takes into consideration the TNM (tumor, lymph nodes, metastasis) classification. Its main objectives include pain management – frequently neuropathic or secondary to chemotherapy or post-mastectomy, improved scapulohumeral mobility, improved muscle strength, lymphedema reduction, ADL resumption, etc. A relevant number of studies were conducted between 2001 and 2011 to identify general principles regarding the rehabilitation of patients diagnosed with breast cancer. One of the basic principles addresses the rehabilitation of the upper limb. As regards electrotherapy, it has been demonstrated that low-frequency currents like DDC (diadynamic current) or TENS (transcutaneous electrical nerve stimulation) can be used. The contraindications result from the absence of clinical studies rather than any proven side effects of electrotherapy. Hydrogymnastics is not contraindicated. However, sauna and thermotherapy are not recommended. Underwater showers and compressed air baths can be recommended, while peloids are recommended for distant

involvement (e.g. knee, hip involvement).

2. Physical medicine and rehabilitation programs improve the quality of life by reducing fatigue, increasing physical functionality and improving pain or dyspnea.

3. Numerous recent studies have demonstrated the major utility of kinetotherapy and the need to initiate it as soon after surgery as possible. According to a large body of evidence published in recent years, including randomized trials and systematic reviews, there is an urgent need to update the guidelines on upper extremity musculoskeletal impairments and lymphedema. Furthermore, additional research is needed to provide an evidence base for developing rehabilitation guidelines on the management of other impairments identified with the prospective surveillance model, e.g. arthralgia.

4. To conclude: "Learning to live with cancer is an art, not a science. Each person must find her own way, in her own style. What is important to realize is that a way can be found regardless of the circumstances and prospects." Jane Brody

Conflicts of interests

There are no conflicts of interest.

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Methodology for the rehabilitation treatment of the posttraumatic knee in athletes

Metodologia tratamentului de recuperare a genunchiului posttraumatic la sportivi

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Abstract

The knee is the largest and the most complex joint of the body. It is an intermediate joint of the lower limb involved in orthostatism and walking dynamics. It is also the most common site for injuries in athletes during sports competition and training, affecting soft tissues and joints.

The main objectives of rehabilitation treatment are to relieve pain, to improve mobility deficit and stability, and to restore a normal walking pattern. It is essential to set an early, complex, individualized treatment to recover functional deficit and to prevent degenerative complications that can appear prematurely and in severe forms in athletes following injuries, but also because of joint overloading due to repetitive mechanical stress.

The rehabilitation program must include electrotherapy with antalgic, antiinflammatory and myorelaxant effects, thermotherapy: cold and cryotherapy in acute phases, followed by warm procedures, massage for myorelaxant or muscle toning effects. A central role in the recovery treatment should be played by kinotherapy and hydrotherapy and also, balneotherapy based on natural physical factors: mineral water, mud pack and climate, with prophylactic, therapeutic and recovery effects.

The traumatic disorder of the knee in athletes requires special attention regarding the rehabilitation treatment, due to their predisposition to develop arthrosis at relative young ages.

Key words: posttraumatic knee, rehabilitation treatment, arthrosis.

Rezumat

Genunchiul este cea mai mare și cea mai complexă articulație a corpului. Este o articulație intermediară a membrului inferior, implicată în asigurarea ortostatismului și a dinamicii mersului. Traumatismele la nivelul genunchiului survin frecvent la sportivi, în timpul competițiilor sportive și a antrenamentelor, afectând părțile moi, structurile osoase și cele articulare.

Tratamentul de recuperare are ca principale obiective combaterea durerii, a deficitului de mobilitate și stabilitate și refacerea schemei normale de mers. Este esențial instituirea precoce a unui tratament complex de recuperare, individualizat, pentru refacerea deficitului funcțional și prevenirea complicațiilor degenerative ce pot surveni prematur și în forme severe la sportivi în urma traumatismelor, dar și din cauza suprasolicitărilor articulare produse de stresul mecanic repetat.

Tratamentul de recuperare trebuie să includă proceduri de electroterapie cu efect antialgic, antiinflamator și miorelaxant, proceduri de termoterapie: reci și crioterapia în fazele acute, urmate de cele calde, masajul cu rol miorelaxant sau de tonifiere musculară. Un rol central în cadrul tratamentului de recuperare trebuie să îl aibă kinoterapia și hidrokinetoterapia. De asemenea, în cadrul tratamentului de recuperare ar trebui să fie inclus și tratamentul balnear bazat pe factori naturali de cură - ape minerale, nămolul și climatul - cu scop profilactic, terapeutic și de recuperare.

Patologia traumatică la nivelul genunchiului, survenită la sportivi, impune o atenție deosebită în ceea ce privește tratamentul de recuperare, datorită predispoziției acestora pentru apariția artrozei la vârste relativ tinere.

Cuvinte cheie: genunchi posttraumatic, tratament de recuperare, artroză.

Received: 2014, April 26; *Accepted for publication:* 2014, May 15;

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Introduction

The knee is the largest and most complex joint of the body. It is an intermediate joint of the limb involved in providing orthostatism and walking dynamics. Injuries to the knee frequently occur in athletes during sports competitions and training, affecting soft tissues, bones and joint structures.

Elements of anatomy

The knee consists of three joints: the femorotibial and femoropatellar joints participating in its active movements and the superior tibiofibular joint that contributes to ankle movements and just to sliding movements of the knee. The knee has one degree of freedom, flexion and extension. In fact, the knee can achieve six directions of movement: flexion-extension, lateral and medial rotation, valgus and varus, anterior and posterior translational, medial and lateral translational, compressive and tensile. In addition to flexion and extension movement, the rest form the "joint play" (Sbenghe, 1987).

In the biomechanics of the knee, the most important issue is related to stability, which is a priority in terms of recovery objectives compared to mobility. Stability has two components: passive and active (Popescu & Florea, 2008).

An important factor of stability is joint loading, the knee being a hinge joint, subject to load, such as gravitational pressures, represented by body weight, dynamic ones, and those caused by muscle strength. Although the pressure exerted on articular cartilage is a risk factor for the development of degenerative changes, in the case of the knee, the load is a stability factor. The minimal pressure per unit area occurs when the knee is in full extension, the matching of the joint is high and the joint contact area is maximized. In two-leg stance, the knee load is equal to half of the body weight, while in single-leg stance the load of the knee is equal to the body weight (Sbenghe, 1981).

The passive stability of the knee is given by the shape of the articular surfaces, by the capsular ligament elements; the joint capsule is reinforced by six ligaments: the patellar ligament, the internal and external side, the anterior and posterior cruciate ligament and the coupled femorotibial axes.

Active stability is given by the muscles. Hamstrings-semimembranosus muscles, femoris biceps and semitendinosus provide knee flexion, while the quadriceps-rectus femoris muscle, vastus medialis, lateralis and intermedius provide extension and pull the knee back. The sural-gastrocnemius and soleus triceps pull back the femoral condyles and tibia (Popescu & Florea, 2008).

Traumatic pathology of the knee

- injuries of the soft tissues, skin and subcutaneous tissue: burns, bruises, wounds; muscles and tendons: stretching, tears, cuts and disinsertion; vessels and nerves: tears and cuts;
- bone lesions in the tibial, femoral and peroneal epiphysis: trabecular faults, cracks, fractures;
- joint injuries: sprains, dislocations, joint wounds, ligament tears, meniscal injuries

Posttraumatic sequelae in athletes consist of: stability and mobility impairment, impaired motor control, decreased muscle strength and endurance, pain and joint swelling, muscle contractures, axial deviation, flexor or extensor paralysis (Popescu & Florea, 2008).

Posttraumatic chondral and subchondral knee lesions are persistent on MRI imaging for several years. Cartilage biopsy shows chondrocyte degeneration and necrosis, and loss of proteoglycans (Atsuo et al., 2006).

Some studies carried out in vitro show chondrocyte apoptosis after traumatic injury and bone changes in cellular metabolism (Colwell et al., 2001).

Bursitis, tendonitis, muscle spasms, meniscal injuries can all cause the same knee pain syndromes (Cibere et al., 2004).

Varus or valgus deviations of the knee are responsible for the occurrence of osteoarthritic changes in the medial or lateral tibiofemoral compartment. Both lead to the reduction of the mobility of the joint, of the articular space and to degenerative changes (Gary et al. 2009, Sharma, 2004, Brauwer et al. 2007, Sharma, 2004; Cahue et al., 2004).

The diagnosis of posttraumatic disorders

The diagnosis of traumatic injuries involves clinical and imaging investigations; laboratory tests are not relevant, they are only useful for differential diagnosis. The radiographic imaging investigations may reveal a narrowing of the joint space, which is suggestive for both degenerative changes and meniscal lesions (Gary et al., 2009; Raynauld et al., 2004).

Meniscal ligament tears, synovitis, chondral and subchondral lesions and soft tissue lesions can be identified using nuclear magnetic resonance. Their appearance and the progression of degenerative changes associated with bone edema can also be viewed by nuclear magnetic resonance, but this is controversial (Gary et al., 2009, Conaghan, 2006, Garnero et al., 2005, Torres et al., 2006, Raynauld et al., 2006).

Treatment of posttraumatic pathology

Recovery treatment has as a main objective pain relief, mobility and stabilization of the deficit, and restoration of normal walking.

Pain occurring regardless of the type of trauma to the knee appears as continuous intermittent mechanical in nature, inflammatory or mixed, of variable intensity. The rich innervation of the knee explains the appearance of pain in any trauma of the knee.

Pain should be combated with specific means.

A key point in the recovery treatment is fighting functional deficit.

Pharmacological therapy includes depending on the intensity of pain: analgesic and anti-inflammatory medication as a general or local administration form, intra-articular and peri-articular infiltration, anxiolytic and antidepressant medication, opioid or corticosteroid therapy. Considering that major trauma or sports microtrauma, in addition to joint overloading, are predisposing factors for the development of osteoarthritis, chondroprotective treatment should also be established, either as oral

preparations of glucosamine and chondroitin sulfate, avocado oil, soybean oil, or intra-articular infiltration of viscous substitute preparations based on hyaluronic acid.

Hot or cold thermal therapy procedures, depending on the stage of the disease, are used as pain relief.

Postural rest is required either by immobilization in recent lesions, with the knee slightly flexed, or by wearing crutches, a cane or walker for the time duration dictated by the type and location of traumatic injury.

The procedures for low, medium and high frequency electrotherapy and phototherapy have a role in pain relief, fighting muscle contraction, as well as in the prevention and recovery of muscle hypotrophy and atrophy frequently occurring posttraumatically.

When pharmacological and non-pharmacological treatment fails to control symptomatology, the patient requires surgery.

The recovery of the mobility function is primarily aimed at obtaining functional angles necessary to daily activities, first recovering the extension movement and fighting flexum, then maintaining and increasing the flexion movement. To increase joint mobility, all possible means are used. Correct posture is important to adopt in genu flexum for intraarticular pressure reduction and at the level of the capsular ligament apparatus, it is achieved for short periods. In the acute phase of posttraumatic disorders, thermotherapy procedures, electrotherapy and massage have an important role and are applied prior to kinetotherapy treatment. Occupational therapy is aimed at exercise, especially in open kinetic chain, such as riding, swimming, cycling or sports such as basketball and volleyball (Popescu & Florea, 2008).

The restoration of stability is a priority objective in the rehabilitation program for restoring joint mobility. Treatment varies depending on the type of emotional stability: active stability provided by muscle-tendon structures and passive stability provided by the capsule-ligamentous device.

The restoration of active stability concerns the toning of all muscles, which contributes to its achievement, the priority being the quadriceps muscle. The quadriceps plays an important role in stabilizing the knee, especially in the last degrees of extension and in the 60-90 degrees of flexion. The weakness of the quadriceps muscle is a major predictive factor for the occurrence of degenerative changes. Having in view that it can rapidly cause atrophy, immobilization has to be as short as possible, and it is recommended to start a number of exercises as early as possible to maintain and increase the toning and resistance of this muscle.

For quadriceps muscle toning, isometric exercises and progressive loading exercises are recommended. The recovery of quadriceps muscle strength takes 3-6 weeks.

Muscular strength and endurance are recovered by using repeated exercises with small counter-resistance, riding exercises, squats up to 50% of the total weight, up and down exercises, walking and running, rowing exercises. In addition to quadriceps muscle toning, special attention should be paid to the toning of hamstrings, sural triceps and fascia tensor muscles through a series of analytical exercises, exercises in unipodal support from

various degrees of flexion and specific rotation exercises.

Hamstring muscle strength is less affected in knee injuries. As a result, an imbalance of forces appears between the extensor and flexor muscles of the knee; the extensor muscles must normally have a force three times higher than the flexor muscles. Exercises to increase muscle strength and isometric exercises include hamstring counter-resistance. Hamstring muscle toning does not vary with the isometric angle, it can be practiced at any angle of flexion (Popescu & Florea, 2008).

The sural triceps muscle, as well as the quadriceps muscle, is quickly atrophied through immobilization, even if isometric exercises are performed under a plaster cast. Rotator muscles will involve selective activation. The objective is to restore the last 20 degrees of extension (Sbenghe, 1981).

Quadriceps muscle toning is performed by isometric exercises with progressive loading.

In the recovery of posttraumatic knee, toning exercises of the tensor fasciae latae muscle are also indicated.

Restoring the normal walking pattern is a further objective after regaining stability and motor control. Normal walking supposes the absence of any inequality in the lower limbs, proper muscular strength, proper range of motion, coordination, control and balance and absence of pain. At the beginning, the exercises are done without loading, and subsequently, with progressive loading (Popescu & Florea, 2008).

Particular attention should be paid to the four subdivisions of walking: bead attack, average position, separation and balancing and the two important components: support and balance.

Secondary prophylaxis rules - orthopedic hygiene in posttraumatic pathology - must be known and respected by the patient. The rules include normal weight or even underweight, avoiding to walk on uneven ground, climbing in and out of the stairs, prolonged walking and standing, postural standing twice a day, following the kinetotherapy program in the long term, avoiding lameness through a permanent control of walking, stick support, free movements of flexion in the transition from sitting to standing position, avoiding prolonged monotonous positions of flexion at the knee, wearing proper shoes with flexible soles, soft heel of 2-3 centimeters, the use of inserts for flat feet.

The peculiarities of recovery are different depending on the type of lesion occurring at knee level.

In case of cutaneous and subcutaneous lesions, there are no special problems of recovery, only when complications arise, such as penetrating wounds, vascular lesions, nerve, ligament or tendon-retractile scars post-burns.

In case of burns, the recovery treatment includes correct postures and mobilization, creating a balance between these two phases; retractile scars can severely limit movement. Active mobilization should be done carefully because the stretching of tissues can trigger their rupture, with bleeding and the formation of new scars. Recovery treatment provides: correct posture, hydrokinetotherapy, massage with ointment, potassium iodide ion galvanization, ultrasound with hydrocortisone, diapulse (Popescu & Florea, 2008).

Muscle-tendon injuries require a differentiated recovery by affecting the extensor or flexor apparatus. In case of damage to the extensor apparatus during immobilization, isometric quadriceps exercises, bipolar electrotherapy, excitomotor currents, thigh and calf toning massage, and also venous lymphatic drainage and diapulse massage are required. After immobilization, it is recommended to continue with isometric exercises, electrotherapy and toning massage. Prior to kinetotherapy, thermotherapy procedures are introduced and the toning of the quadriceps is initiated by resistive exercises with progressive loading, increasing the joint mobility through active and passive mobilization and resumption of walking, at the beginning with partial support.

In case of damage to the flexor apparatus, toning exercises on flexion and extension muscle groups are required, as well as a series of electrotherapy procedures with anti-inflammatory role, painkillers and muscle relaxants, thermotherapy, therapeutic massage and kinetotherapy.

Ligament injuries occur in the context of abnormal movements exceeding the knee ligament strength. Depending on their severity, they are classified as mild sprains with stable joint and severe sprains with unstable joint.

For mild sprains, mobility and stability is affected due to ligament distension and eventually, to the rupture of some fibers. In the early stages, in addition to appropriate pharmacological therapy and anti-inflammatory painkillers, the following are required: application of ice, infiltration with lidocaine, preferably without glucocorticoids, which can hide more serious symptoms, wearing knee braces, electrotherapy as ion galvanization, currents of low, medium and high frequency and kinetotherapy treatment in the treatment room or as hydro-kinetotherapy.

Moderate sprains require the application of ice, symptomatic pharmacological treatment, partial load in the affected knee, immobilization in a cast or brace, electrotherapy, mobilization of neighboring joints, massage and kinetotherapy exercises during isometric immobilization, subsequently progressive mobilization exercises and increase of muscle toning in the knee stabilizing muscles. The peculiarities of recovery include:

- for external sprains, particularly toning of the tensor fasciae latae and biceps crural muscles;
- for internal sprains, particularly toning of the semimembranosus, semitendinosus, and the tailor's muscle;
- in the traumatic pathology of the anterior cruciate ligament, particularly toning of hamstrings;
- in the traumatic pathology of the posterior cruciate ligament, particularly toning of the sural triceps muscle.

Anterior cruciate ligament rupture mostly occurs in young people under 30 years of age, in women 3-5 times more frequently than in men, as well as in those who practice sports involving pivoting (Friel & Chu, 2013).

Strong mechanical forces acting on the knee during high impact activities, in addition to inducing ligament injuries, especially in the anterior cruciate ligament, favor the emergence of early degenerative changes (Yeow et al., 2008).

Sprains that severely affect the stability of the knee often involve, besides the tearing of a ligament, associated capsule-ligament and meniscal injuries, especially in the internal meniscus. Complications can also occur, such as paralysis of the external popliteal sciatic nerve, as well as early osteoarthritic changes. After the immobilization period, which is longer than in mild to medium sprains, i.e. 8-10 weeks, treatment should be complex, involving drug therapy and focusing on recovery thermotherapy, electrotherapy, hydrotherapy, massage and kinetotherapy. Surgical treatment is required in the case of complex injuries, followed by the early initiation of treatment with certain peculiarities: postoperative immobilization is performed at 45 degrees and lasts for 2 weeks, walking braces are recommended, a flexion deficit can remain, usually, extension is fully recovered (Popescu & Florea, 2008).

Knee sprains involve capsule-ligament injuries, often associated with neurovascular injuries. Mild tibiofemoral dislocations can be reduced on the spot and the method of application is the same as for sprains. Severe sprains, after being reduced in hospital, require pelvipodal plaster cast for 1-3 months. During immobilization, isometric exercises, anti-sloping positioning, leg pumping exercises can be performed. Diapulse as an electrotherapeutic procedure can be carried out even with plaster cast 2-3 times per week. After immobilization, it is recommended to perform exercises to increase muscle toning, strength and muscle strength, joint mobility; walking is progressively achieved.

Patellar dislocations require orthopedic reduction, knee braces, and the recovery methodology is generally valid, generally requiring only conservative treatment; in severe forms, surgery is required.

Knee fractures occur in the context of severe trauma and can be located at the upper end of the tibia-fibula or tibial plateau or tibial spine and upper epiphysis, the lower end of the femur - unicondylar, supracondylar, supraintercondylar, upper epiphysis and the kneecap. Knee fractures require immobilization, medication for symptom relief; isometric exercises are necessary for maintaining muscle toning and normal function in the neighboring joints; respiratory gymnastics facilitates venous-lymphatic drainage. After immobilization, complex recovery treatment is initiated, which is focused on the recovery of mobility, stability, strength and muscle strength. It is very important to initiate the recovery treatment as early as possible to prevent joint instability, the risk of repeated fractures or sprains and dislocations, the degenerative process, pain and joint stiffness, vicious callus, muscle atrophy and retractsures, etc.

Fractures of the tibial plateau affect joint mobility and muscle function, the recovery is lengthy, often patients do not recover completely in one year (Gaston et al., 2005).

For axial deviations of the knee, congenital or acquired, conservative treatment is effective only in mild cases under 10-15 degrees and consists of exercises to increase knee stability, orthopedic footwear and normal weight.

Injuries affecting the crural nerve, which plays an important role in thigh flexion and leg extension quickly go to an atrophy of the thigh muscle. In the case of total paralysis, both the quadriceps and iliopsoas are involved,

while in partial paralysis, which is more common, only the quadriceps is involved. The recovery program consists of applying knee orthoses for genu recurvatum, myorelaxant procedures for lumbar paravertebral muscle contraction, maintaining muscle tone in the denervated muscle, rehabilitation of muscle strength through a series of isometric exercises, passive-active, actively assisted, suspension therapy, dynamic exercises with progressive resistance, electrical stimulation and medium excitomotor frequency currents (Sbenghe, 1987).

Algoneurodystrophy is a frequent posttraumatic complication, involving rehabilitation treatment appropriate to its development stage.

Algoneurodystrophy consists of pain and swelling of the lower limbs, accompanied by local trophic skin changes, vasomotor instability and functional impotence (Collier, 2002; Doury & Dequeker, 1998; Herrick, 2003; Ionescu, 2006).

In addition to drug therapy and sometimes surgery, the rest of the affected segment is recommended only at the beginning; cold treatment should be applied at the beginning, then a series of hot thermal procedures, hydrotherapy, analgesic and anti-inflammatory electrotherapy and kinetotherapy.

Knee surgery consists of posttraumatic pathology: synovectomy, pruning, total or partial meniscectomy, patellectomy, arthrodesis, arthroplasty, mosaicplasty, chondrocyte transplant. Recovery begins as early as possible after surgery depending on its scale: 4 days after synovectomy, 10-12 days after meniscectomy, one month after osteotomy, 3 weeks after patellectomy, three days after arthroplasty.

Positioning is aimed at avoiding genu flexum, isometric exercises will be performed. At the beginning, mobilizations will be passive, then passive-active, active and active resistant, walking will be progressively loaded. Earlier isometric exercises for the quadriceps and hamstrings, exercises at the level of the contralateral limb for thigh and leg muscle activation are indicated, maintaining mobility and normal functionality in the adjacent joints. It is important to fight joint inflammation and avoid overstressing the joints. The general objectives of the recovery of the posttraumatic knee are the restoration of mobility and joint stability, muscle strength and endurance, motor control and pain relief.

There is no surgery to restore a lasting functionality of the articular cartilage. A number of experimental approaches have been proposed which combine regenerative therapeutic procedures such as gene therapy, stem cell transplant, biological glue, but none has yet been completed (Scott et al., 2013).

Recovery treatment should be individualized, beginning as early as possible after surgery, with specific treatment in traumatic pathology.

Peculiarities of recovery

The peculiarities of recovery depend on the extent and type of surgery.

- after synovectomy, it is important to combat the inflammatory process; one week postoperatively, walking with crutches is started, after 10-12 days, walking with a

cane, and only after 3 weeks is full support initiated. The recovery based on the etiopathogenesis of the inflammatory process and functional deficits can take up to 6 months.

- after meniscectomy, the knee remains immobilized in extension for 10 days, after which it is recommended to walk with a cane, with the progressive loading of the affected lower limb; giving up the cane is indicated only after 3-4 weeks. However, immediately after surgery, exercises for maintaining muscle toning in the thigh are initiated.

- after meniscectomy, even if performed at a young age, up to 89% of patients will develop osteoarthritis (Klippel, 2001).

- after intraarticular interventions, the recovery treatment begins early. Resumption of walking is done after three weeks, upon the full recovery of knee extension and the possibility to perform hip flexion with extended knee.

- after osteotomy surgery, immobilization in a cast takes 30-45 days, and then the recovery treatment is started. When using external fixation systems, gypsum is no longer needed, from the second day the passive mobilization of the knee is initiated, from the tenth day it is recommended to walk with discharge and active exercises, and on the tenth day, progressive support on the affected limb begins.

- after patellectomy, which by affecting the stability of the knee is an important functional injury of the knee, immobilization in a cast for 3 weeks is recommended, then, the recovery treatment starts.

Arthroplasty may be partially performed and consists of replacing the femoral condyles or tibial plateaus, a bivalve plaster in extension is applied postoperatively, loading is progressively achieved and normal walking is achieved 3 months after surgery. In case of total arthroplasty, walking with progressive loading is resumed in the second week.

Regardless of the type of surgery, orthopedic hygiene rules for the knee are recommended (Popescu & Florea, 2008).

Although a clear physical-pathogenic mechanism has not yet been established, there is a close link between ligament injuries, cartilage alterations in the context of sports injuries, meniscal lesions, impaired biomechanics leading to instability and the emergence of degenerative changes over time (Riordan et al., 2013).

The early initiation of a complex individualized recovery treatment is essential for restoring functional deficits and prevent degenerative complications that can occur early in athletes after severe trauma, but also because of joint saturation caused by repeated mechanical stress. Early onset severe arthritis means absenteeism, affecting professional activity and leading to a major economic impact (Fautrel et al., 2005).

Recovery treatment should include electrotherapy procedures with pain relievers, anti-inflammatory and muscle relaxants, thermotherapy procedures: cold and cryotherapy in the acute phase, followed by warm massage or muscle toning. An important role in the recovery treatment should be played by physiotherapy and hydrokinetotherapy. Also, the recovery treatment should include spa treatment based on natural cure factors - mineral waters, mud and climate - with prophylactic and therapeutic effects.

Conclusions

1. It is important to involve a multidisciplinary team, including orthopedic specialists, physical therapists, medical rehabilitation specialists and kinesiologists.

2. Complex rehabilitation treatment should be started as early as possible to shorten the recovery time of athletes, facilitating recovery of functional deficit and resumption of sport competitions.

3. In order to early prevent the onset of osteoarthritis, patients should receive long-term rehabilitation treatment as necessary, which will be repeated twice a year for preventive and prophylactic purposes.

Conflicts of interests

There are no medical or financial conflicts of interest.

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Aspecte medico-istorice referitoare la întemeierea Societății Medicale de Educație Fizică din București

Medico-historical aspects related to the foundation of the Medical Society of Physical Education from Bucharest

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Rezumat

În perioada interbelică, în România au fost făcute diferite încercări pentru organizarea educației fizice pe criterii medicale. Astfel, în 1932, la București a fost înființată Societatea Medicală de Educație Fizică. Aceasta a fost inițiată de membrii Serviciului Medical al Oficiului Național de Educație Fizică.

Primul comitet director al Societății - ales în 15 aprilie 1932 - a fost compus din: Colonel Dr. Mihail Lascăr - președinte, Asist. Dr. Ion Pavel și Dr. Aurel Siligeanu - vicepreședinți, Dr. Florian Covaciu Ulmeanu - secretar general și Dr. Adrian Ionescu - casier. Ceilalți membri ai aceluiași comitet au fost: Conf. Dr. Emil Crăciun, Asist. Dr. Ștefan Marius Milcu, Asist. Dr. Liviu Telia etc.

Membrii de onoare - aleși în aceeași zi - au fost: Colonel Virgil I. Bădulescu - director general al Oficiului Național de Educație Fizică, Conf. Dr. Gheorghe Banu - secretar general al Ministerului Muncii, Sănătății și Ocrotirilor Sociale, General Prof. Dr. Mihail Butoianu - inspector general al Serviciului Sanitar al Armatei, General Dr. Constantin Costea - medicul șef al Corpului Vânătorilor de Munte, Prof. Dr. Daniel Danielopulu - director al Institutului Clinico-Medical al Spitalului „Filantropia” din București, Prof. Dr. Iuliu Hațieganu - directorul Clinicii Medicale a Facultății de Medicină din Cluj, Prof. Dr. Ioan Nițescu - conducătorul Institutului de Fiziologie al aceleiași Facultăți, Prof. Dr. Francisc Rainer - directorul Institutului de Anatomie al Facultății de Medicină din București ș.a.

În primul articol, din statutul Societății, a fost precizat obiectivul său fundamental: introducerea obligatorie a controlului medical metodic în toate instituțiile și asociațiile unde se practică exerciții fizice. De asemenea, rolul Societății a fost de a grupa medicii care sunt preocupați de igiena exercițiilor fizice și de aspectele biologice ale educației fizice.

Cuvinte cheie: Societatea Medicală de Educație Fizică, comitet director, statut.

Abstract

During the interwar period, in Romania were done various attempts to organize physical education having medical criteria. Thus, in 1932, in Bucharest was founded the Medical Society for Physical Education. It was initiated by the members of the Medical Department of National Office of Physical Education.

The first steering committee of this Society, elected on 15 April 1932, included: Colonel Dr. Mihail Lascăr - president, Assist. Dr. Ion Pavel and Dr. Aurel Siligeanu - vicepresidents, Dr. Florian Covaciu Ulmeanu - general secretary and Dr. Adrian Ionescu - treasurer. The other members of the same committee were: Assoc. Prof. Dr. Emil Crăciun, Assist. Dr. Ștefan Marius Milcu, Assist. Dr. Liviu Telia etc.

The honorific members were: Colonel Virgil Bădulescu - general director of the National Office of Physical Education, Assoc. Prof. Dr. Gheorghe Banu - general secretary of the Ministry of Labor, Health and Social Care, General Prof. Dr. Mihail Butoianu - general inspector of Health Service of the Army, General Dr. Constantin Costea - chief physician of Mountain's Hunters Organisation, Prof. Dr. Daniel Danielopulu - director of the Clinico-Medical Institution of the “Filantropia” Hospital in Bucharest, Prof. Dr. Iuliu Hațieganu - director of the Internal Clinic of the Cluj Faculty of Medicine, Prof. Dr. Ioan Nițescu - chief of the Institute of Physiology from the same Faculty, Prof. Dr. Francisc Rainer - director of the Institute of Anatomy of the Bucharest Faculty of Medicine etc.

In the first article of the Society's status was mentioned its fundamental objective: the compulsory introduction of methodically medical supervision in all institutions and associations where physical exercise was practiced. Also the role of this Society was to group physicians who were interested by the hygiene of physical exercise and by the biological aspects of physical education.

Key words: Medical Society for Physical Education, steering committee, statute.

Received: 2014, April 4; *Accepted for publication:* 2014, April 25;

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Introducere

În perioada interbelică, în România au fost făcute diferite încercări pentru organizarea educației fizice pe criterii medicale. Un exemplu remarcabil în acest sens a fost dat în 1930 de celebrul internist Prof. Dr. Iuliu Hațieganu (1885-1959) - care era directorul Clinicii Medicale din Cluj. El a întemeiat „Societatea Medicală pentru Educație Fizică Cluj” și a fost ales președintele acesteia (***, 1932a). De notat faptul că Hațieganu a sprijinit introducerea educației fizice în învățământul superior în anul 1930/1931, când a fost rector al Universității „Regele Ferdinand I” din Cluj.

După doar doi ani, adică în 1932, la București a fost înființată Societatea Medicală de Educație Fizică. Aceasta a fost inițiată de către medicii din Serviciul Medical al Oficiului Național de Educație Fizică (ONEF).

Această Societate a fost fondată pornind de la două considerente, unul pozitiv și celălalt negativ. Motivul pozitiv a fost acela al necesității stringente de a introduce practicarea metodică a exercițiilor fizice sub îndrumarea medicală de către „marele mase” ale populației. Expresia „marele mase” - care este utilizată în statutul Societății - este semnificativă pentru a arăta faptul că numărul persoanelor care practicau diverse tipuri de educație fizică era în creștere. În acest sens, a fost precizat faptul că Societatea Medicală de Educație Fizică are scopul de a introduce controlul medical metodic în toate instituțiile și asociațiile unde se practică exerciții fizice.

Aspectul negativ, pe care noua Societate trebuia să-l combată era acela că: „practica nesocotită a sporturilor a dus [...] de multe ori la o stare de secătuire organică, cauzată de supraantrenament, sau chiar la afecțiuni organice grave” (***, 1932b).

Așa cum a fost stipulat în statut, răspândirea exercițiilor fizice este benefică, dacă este controlată medical, deoarece „influențează dezvoltarea individului și constituie un important capitol de igienă socială” (***, 1932b).

Câteva date despre începuturile practicării educației fizice în România, în a doua jumătate a secolului al XIX-lea

Începuturile organizării educației fizice în România au avut loc în timpul celebrului medic Carol Davila (1828-1884), prin implicarea lui Gheorghe Mocianu (1835-1909). El a fost denumit sugestiv „primul educator fizic român”, de către Onoriu Chețianu (1906-1979) (Chețianu, 1939).

Scopul lui Gh. Mocianu a fost să introducă exercițiile fizice în programul de viață al tinerilor. Prima organizare cu profil sportiv pe care a întemeiat-o a fost gruparea „Micii dorobanți”. Aceasta a avut rolul de a dezvolta starea fizică a tineretului, pentru a facilita pregătirea sa militară. În plus, a urmărit trezirea conștiinței naționale a românilor. În 1864 el a introdus, ca obiect facultativ, gimnastica în licee. Tot la sugestia sa, s-a legiferat implementarea gimnasticii în armată. De asemenea, el a pledat pentru practicarea educației fizice de către femei și copii (Bârsu, 2007).

Privire generală asupra practicării educației fizice în București, în perioada interbelică

Pornind de la acest nivel al educației fizice din România, la începutul secolului al XX-lea, preocuparea

pentru implementarea la grupe de populație a educației fizice și a sportului s-a dezvoltat. Este interesant faptul că în primul deceniu interbelic numeroși bucureșteni practicau: patinajul, fotbalul, baschetul, rugby, scrima, boxul, golful, canotajul, atletismul, cursele de ciclism, vânătoarea etc. De asemenea exista interes pentru gimnastică și dans sportiv. Atunci au fost organizate săli și terenuri speciale de sport, precum: sala Academiei Naționale de Educație Fizică, sala de scrimă a Cercului Militar, sala de box a CFR, bazinul de înot „Lido” și patinoarul „Oteteleșanu”. Referitor la cursele de cai, aspectul sportiv tindea să ajungă pe planul al doilea, deoarece era surclasat de componenta financiară (pariurile) (Nicolae, 2000). Pe lângă efectul sanogen al practicării diferitelor sporturi, mulți bucureșteni manifestau dorința de a se alinia la modurile mondene de petrecere a timpului liber din străinătate (Pârvulescu, 2003). Ținând cont de amplificarea necontrolată a practicării educației fizice, a fost necesar să se treacă de la nivelul cantitativ la etapa calitativă, adică la îndrumarea medicală metodică a practicării educației fizice.

Condițiile de înființare a Societății Medicale de Educație Fizică din București

Pe baza experienței personale în educația fizică și știind diverse realizări în acest domeniu din diferite țări, medicii din Serviciul Medical al ONEF au lansat în noiembrie 1931 un apel către numeroși medici, care erau interesați de activitatea sportivă. În apel au fost prezentate câteva date asupra situației referitoare la practicarea educației fizice de către unele categorii ale populației din România și din străinătate și s-a insistat asupra importanței acestei activități. Scopul acestui demers a fost evaluarea necesității de a se întemeia o societate medicală de educație fizică la București. Pentru ca datele obținute să fie mai relevante, au fost solicitate părerile atât ale unor medici civili, cât și militari. Din răspunsurile primite, s-a constatat că era aproape imperativ să fie înființată o asemenea societate medicală în Capitală.

Apoi au fost convocați numeroși medici la o ședință preliminară, necesară creării acestei societăți. Această reuniune a avut loc în 8 aprilie 1932. După numai o săptămână - adică în 15 aprilie 1932 - s-a desfășurat ședința de constituire a Societății. La ambele întruniri au participat: Colonel Dr. Mihail Lascăr (1889-1959), General Dr. Constantin Costea (1877-?), Colonel Dr. Constantin Mihăilescu (1891-1943), Dr. Horia Dumitrescu (1893-1987), Dr. Ion Pavel (1897-1991), Conf. Dr. Emil Crăciun (1896-1976), Conf. Dr. T. Saragea, Dr. Ion Făgărășanu (1901-1987), Dr. Gheorghe Tătărănu (1898-1975), Dr. Ștefan Marius Milcu (1903-1997), Dr. Aurel I. Siligianu, Dr. Gheorghe Comșa (1903-?) și Dr. Gheorghe Pallă (1901-?) ș.a.

Date de bază despre membrii care au participat la constituirea Societății Medicale de Educație Fizică din București

Este necesar de precizat câteva date semnificative despre statutul profesional al celor care au participat la organizarea acestei Societăți și a nota câteva repere ale evoluției carierelor lor. Astfel, se va reliefa diversitatea

spectrului specialităților medicale pe care le reprezentau, se vor putea pune în evidență medicii care erau implicați în educația fizică din România în 1932 și cei care au continuat să activeze în acest domeniu.

Mihail Lascăr a avut o amplă carieră militară. În 1946-1947 a fost ministrul Apărării Naționale (2).

Constantin Mihăilescu a fost profesor de fiziologie la Institutul Superior de Educație Fizică din București (ISEF). El a fost primul titular al Disciplinei de Fizică Biologică de la Facultatea de Medicină din Capitală, unde a predat din 1927 până în 1939 (Bârsu, 2011). Între anii 1938 și 1941 a fost rector al Academiei Naționale de Educație Fizică din București.

Horia Dumitrescu s-a format ca anatomist sub îndrumarea Prof. Dr. Fr. Rainer, căruia i-a fost asistent. În 1931 Dumitrescu a devenit profesor de anatomie și biotipologie la ISEF. Ulterior, din 1939 până în 1949 a fost rector al acestui Institut (Ionescu, 1991).

Ion Pavel era în 1932 asistent la Clinica Medicală a Spitalului „Colțea” din București. În evoluția sa didactică a fost profesor la Catedra de Nutriție și Boli Metabolice de la Institutul de Medicină și Farmacie din același oraș. În 1948 a înființat Centrul de Asistență a Diabeticilor din Capitală (Rusu, 2003).

Emil Crăciun era conferențiar de anatomie patologică la Facultatea de Medicină din București. Tot aici a devenit profesor. În 1937 a fost numit director al Institutului „Victor Babeș” din Capitală (Roșculescu, 2006).

Ion Făgărășanu a fost asistent la Catedra de Anatomie Descriptivă și Topografică a Facultății de Medicină din București, sub conducerea Prof. Dr. Dimitrie Gerota (1868-1939). Apoi Făgărășanu s-a transferat la în domeniul chirurgiei, unde a parcurs ierarhia didactică, ajungând în 1949 profesor de chirurgie la Clinica de Chirurgie a Institutului de Medicină și Farmacie București, care era situată la Spitalul „Carol Davila” (Ilea et al., 1963; Rusu, 2003).

Gheorghe Tătăranu era medic militar activ. Apoi, în 1946 a ieșit din armată cu grad de colonel și a fost titular la Catedra de Igienă a Academiei Naționale de Educație Fizică din București (***, 2009).

Ștefan Marius Milcu era în 1932 asistent universitar la Catedra de Anatomie și Embriologie a Facultății de Medicină din Capitală, avându-l drept conducător pe Prof. Dr. Francisc Rainer. După trei ani Milcu s-a transferat la Clinica de Endocrinologie, condusă de Prof. Dr. Constantin Parhon. În 1948 Milcu a fost avansat profesor la aceeași Clinică de la Institutul de Medicină și Farmacie București (Ilea et al., 1963). De-a lungul lungii sale cariere a avut, uneori, preocupări de anatomie și educație fizică, de exemplu cercetarea intitulată „Studii asupra tipului morfologic al unui grup de înotători”, pe care a efectuat-o în colaborare cu Horia Dumitrescu (Grigorescu și Dumitrache, 2000).

Aurel I. Siligianu a fost președintele Federației de Natație. În perioada interbelică el s-a manifestat și drept colecționar de artă plastică.

Gheorghe Comșa a fost medic internist la Spitalul „Elias” din București (***, 1941).

Gheorghe Pallă și-a susținut doctoratul în medicină și chirurgie la Facultatea de Medicină din Capitală în 1941

(***, 1948).

La prima ședință au fost absenți: Prof. Octav Onicescu (1892-1983) Prof. Radu Olinescu, Conf. Dr. Vintilă Ciocâlțeu (1892-1947), Conf. Dr. Stoichiță, Dr. Vasile Stepleanu-Horbatschi (1888-?), Docent Alfred Teitel (1900-1980) și Dr. Coriolan Andreescu (1902-?). În continuare vom menționa pe scurt statusul social al acestor oameni de știință.

Octav Onicescu era în 1932 directorul Institutului Superior de Educație Fizică (ISEF), unde a predat în perioada 1925-1932 mecanica mișcării și aparatelor (Rusu, 2003).

Radu Olinescu era profesor la același Institut (ISEF). În perioada 1921-1938, el a predat pentru studenții farmaciști din București noțiuni de zoologie și parazitologie. Tot pentru studenții de la aceeași facultate el a predat cursuri de igienă între anii 1924-1938 (Ilea et al., 1963).

Vintilă Ciocâlțeu a fost conferențiar la Disciplina de Chimie Clinică și Boli de Nutriție a Facultății de Medicină din București în perioada 1931-1938. Din 1938 până la decesul său a fost profesor la Catedra de Chimie Generală Medicală și Chimie Biologică a aceleiași Facultăți. În paralel cu cariera universitară, a avut o interesantă activitate culturală, care a fost desfășurată mai ales în domeniul poeziei (Bercuș, 1981).

Vasile Stepleanu-Horbatschi a fost profesor la ISEF. În paralel a fost medic, asistent universitar la Clinica ORL din Capitală (***, 1941).

Alfred Teitel care a fost asistent al Prof. Dr. Fr. Rainer la Catedra de Anatomie și Embriologie de la Facultatea de Medicină din București. Apoi Teitel a fost docent, post care era interimar spre acela de conferențiar. Ulterior el a fost profesor de farmacologie la aceeași Facultate.

Coriolan Andreescu a fost absolvent al Facultății de Medicină din Cluj. Este probabil ca interesul său pentru practicarea educației fizice pe criterii medicale să fi fost trezit în perioada cursurilor de medicină interne, care erau predate de Prof. Dr. Iuliu Hațieganu. După absolvire, C. Andreescu a fost medic primar ORL la Spitalul din Brăila.

Există o nelămurire referitoare la Conf. Dr. Stoichiță. În broșura de prezentare a constituirii Societății Medicale de Educație Fizică nu este specificat prenumele său, nici în forma completă, nici ca inițială. Probabil că acest conferențiar a fost același cu Dr. Iosif Stoichiță (1892-1972), care era discipol al Prof. Dr. Iuliu Hațieganu. I. Stoichiță a părăsit învățământul medical superior din Cluj în 1922, având gradul de asistent universitar. În al doilea deceniu interbelic nu a avut carieră universitară și a fost președinte al Colegiului Medicilor din Sibiu (Bojiță et al., 1999).

La cea de-a doua ședință a Societății Medicale de Educație Fizică au luat parte: Colonelul medic Virgil Bădulescu (1882-1944), Colonelul Emil Pălăngeanu, maiorul I. Hergot și căpitanul F.C. Niculescu.

Virgil Bădulescu a fost unul dintre organizatorii învățământului superior de gimnastică din România. În 1922 el a fost unul dintre principalii fondatori ai INEF, instituție pe care apoi a condus-o ca director. Înainte de izbucnirea Primului Război Mondial, a urmat studii la Institutul Regal de Gimnastică din Stockholm. Pentru meritele sale, în 1933 a fost promovat general (1).

Emil Pălăngeanu era în 1932 comandantul Institutului Militar de Educație Fizică (IMEF). De notat faptul că el a fost co-fondator al ONEF. A fost președinte al Federației Române de Atletism de două ori: în perioada 1933-1935, apoi între anii 1939-1940. Pentru meritele sale fost avansat general (3).

Căpitanul F.C. Niculescu a fost, probabil, același cu dr. Constantin Niculescu (1884-?), care a fost medic primar la Serviciul de Ginecologie al spitalului C.F.R. din Capitală (***, 1941).

Primul comitet director al Societății – ales în 15 aprilie 1932 – i-a avut în funcții de conducere pe Colonel Dr. Mihail Lascăr - președinte, Dr. Ion Pavel și Dr. Aurel I. Siligeanu - vicepreședinți, Dr. Florian Covaciu-Ulmeanu (1903-1973) - secretar general, Dr. Adrian N. Ionescu (1904-?) - casier, Dr. A. Strugurescu și Locotenent Dr. Traian Demetrescu - secretari de ședință. Membrii comitetului au fost: Dr. Coriolan Andreescu, Conf. Dr. Emil Crăciun, Asist. Dr. Ștefan Marius Milcu, Dr. Carol O. Schmidt, Dr. Gheorghe Tătăranu și Asist. Dr. Liviu Telia.

Florian Covaciu-Ulmeanu a fost între anii 1930-1940 medic militar – de exemplu la Centrul Medical Aeronautic – și în paralel a activat în domeniul educației fizice. În 1933 a fost încadrat asistent al Prof. C. Michăilescu, la Catedra de Fiziologie a ISEF din Capitală. În 1950 Ulmeanu a fost trecut în rezervă cu gradul de colonel și a rămas profesor la Institutul de Educație Fizică și Sport (Marian, 2003).

Adrian N. Ionescu a fost absolvent din prima promoție a ISEF din București. El a avut o amplă carieră în educația fizică medicală, ajungând conferențiar și șeful Disciplinei Cultură Fizică Medicală de la Facultatea de Pediatrie a IMF. București, funcție pe care a avut-o din 1964 până la pensionare (Burghel et al., 1968).

A. Strugurescu era în 1932 asistentă la ISEF din București.

Traian Dumitrescu (1903-1988) activa în 1932 ca medic secundar în Serviciul Medical III al Spitalului Militar Central din Capitală și era medicul ONEF. Din 1932 până în 1934 a fost asistent suplinitor la Catedra de Fiziologie Aplicată de la ISEF. În perioada 1934-1945 a fost profesor la Catedra de Prim Ajutor și Anatomie Aplicată de la Institutul Militar de Educație Fizică (***, 2009).

Liviu Telia a fost colaborator al Prof. Dr. I. Hațieganu în proiectele sale privitoare la introducerea educației fizice în mediul universitar. Telia a urmat studii de perfecționare în cardiologie și medicină sportivă la Viena și la München (Marin, 2002).

Membrii de onoare, care au fost aleși la ședința de înființare a Societății Medicale de Educație Fizică, au fost: Colonel Virgil I. Bădulescu, Conf. Dr. Gheorghe Banu (1889-1957), General Prof. Dr. Mihail Butoianu (1876-1935), General Dr. Constantin Costea (1877-?), Prof. Dr. Ion Bălăcescu (1870-1944), Prof. Dr. Francisc Rainer (1874-1944), Prof. Dr. Daniel Danielopolu (1884-1955), Prof. Dr. Iuliu Hațieganu și Prof. Dr. Ioan Nițescu (1884-1971).

Gheorghe Banu a fost igienist. În 1932 era secretar general al Ministerului Muncii, Sănătății și Ocrotirilor Sociale. O importantă realizare a sa a fost fondarea revistei de Igienă Socială. De asemenea, el a contribuit la introducerea metodelor statistice și monografice în

cercetarea medico-socială (Duțescu și Marcu, 1980).

Mihail Butoianu era în 1932 inspector general al Serviciului Sanitar al Armatei. El a fost câțiva ani șeful Secției de Chirurgie a Spitalului Militar din Capitală. Din 1924 până în 1935 a fost profesor de chirurgie operatorie la Facultatea de Medicină din Iași. De notat faptul că această materie era predată în cadrul Catedrei de Anatomie (Ionescu, 1991; Bârsu, 2004).

În același an (1932) Constantin Costea era medicul șef al Corpului Vânătorilor de Munte (***, 1941).

Ion Bălăcescu era decanul Facultății de Medicină din Capitală. El a fost fondatorul școlii românești de chirurgie infantilă (Duțescu și Marcu, 1972).

Francisc Rainer a fost conducătorul Institutului de Anatomie și Embriologie al Facultății de Medicină din București, timp de două decenii (1920-1940). El a organizat Institutul de Antropologie din Capitală. De asemenea, în 1930 el a fost director al Institutului Superior de Educație Fizică. Atunci a participat la Congresul Internațional de Fiziologie a Exercițiilor Fizice, care a avut loc la Stockholm. La începutul carierei sale, în intervalul 1913-1920, fusese profesor la Catedra de Anatomie a Facultății de Medicină din Iași (Rainer, 1979).

Daniel Danielopolu a fost clinician, fiziolog și farmacolog. A fost promotor al unității dintre activitatea clinică și cercetarea fiziopatologică și farmacodinamică. În 1932 era director al Institutului Clinico-Medical al Spitalului "Filantropia" din Capitală. După trei ani avea să fondeze Academia de Medicină din București (Brătescu et al., 1977).

Ioan Nițescu a fost directorul Institutului de Fiziologie al Facultății de Medicină din Cluj din 1919 până în 1934, apoi a fost conducător al Institutului de aceeași specialitate de la Facultatea de Medicină din București, până în 1956. Atunci a studiat diverse aspecte ale efortului muscular și ale oboselei (de exemplu rolul vitaminei C) (Baciu, 1980).

Prima ședință publică a Societății Medicale de Educație Fizică

Aceasta a avut loc în 27 mai 1932, la ONEF. La început a fost prezentarea de caz, făcută de A. Strugurescu. Titlul său a fost „Un caz de spondilolystesis în legătură cu controlul medical al exercițiilor fizice”. Apoi au fost susținute patru comunicări: „Modificări morfologice ale sângelui la concurenții de ski” – de C. Costea și Gh. Tătăranu, „Evoluția cronaxiei în cursul antrenamentului fizic” – de Fl. Covaciu-Ulmeanu, „Valoarea câtorva coeficienți antropometrici în diagnosticarea aptitudinilor fizice” – de A. Ionescu și „Modificări morfologice ale sângelui la diferite grade de efort” – de Gh. Tătăranu și Fl. Covaciu-Ulmeanu.

Câteva prevederi din statutul Societății Medicale de Educație Fizică

Considerăm util să menționăm pe scurt câteva prevederi importante din statutul Societății Medicale de Educație Fizică.

Activitatea Societății urma să fie făcută prin: ședințe obișnuite, reuniuni speciale (congrese) și să fie susținută de un „organ de publicitate” (art. 2). În același articol era

subliniat faptul că Societatea avea ca deziderat să creeze condiții favorabile pentru ca membrii săi să efectueze cercetări în domeniul educației fizice medicale.

Privitor la membrii Societății, exista o diferențiere între cei activi, care aveau dreptul la vot deliberativ și puteau fi aleși în comitetul de conducere, și membrii de onoare, care aveau dreptul numai la vot consultativ (art. 4, lit. B).

Alegerile pentru conducerea Societății erau anuale, fiind prevăzute în luna mai (art. 7). Această prevedere avea atât un avantaj, cât și un dezavantaj. Avantajul era că mulți membri puteau ajunge, în timp relativ scurt, la cârma Societății. Astfel aveau posibilitatea de a-și pune în valoare capacitatea managerială, în folosul dezvoltării acestei Societăți. Dezavantajul faptului că mandatul de conducere dura numai un an era imposibilitatea de a derula programe ample și complexe.

Ședințele comitetului director urmau să se țină ori de câte ori este nevoie (art. 11). În ședințele Societății puteau figura: comunicări științifice, conferințe și referate, chestiuni de organizare și aspecte administrative (art. 12).

Averea Societății era formată din cotizațiile membrilor, subvenții, donații, venituri obținute din publicații și cursuri, plus „orice alte venituri” (art. 13).

În caz de dizolvare, averea Societății urma să treacă Serviciului Medical al ONEF.

Discuții

Membrii Societății aveau diferite specialități: anatomie, anatomie patologică, fiziologie, biochimie, medicină internă, chirurgie și ORL. Este interesant faptul că atunci biochimia nu era un domeniu separat la Facultatea de Medicină din București, ci era asociată cu bolile de nutriție. Această diversitate de specialități a fost utilă pentru o abordare complexă, multidisciplinară, a educației fizice medicale.

Participarea medicilor militari a fost destul de amplă, ceea ce a fost o premiză pentru o rigoare benefică în existența acestei organizații.

Este de neînțeles absența dintre membrii Societății a unor personalități marcante, cum ar fi: Prof. Dr. Iuliu Moldovan (1882-1966), fondatorul și conducătorul Școlii de Igienă Socială din Cluj. Medicilor din București le era cunoscută personalitatea lui Moldovan, deoarece el elaborase în 1930 o nouă lege sanitară (care a stârnit multe discuții, datorită prevederilor sale progresiste). Este posibil să fi existat o animozitate față de I. Moldovan.

De asemenea, din această Societate au lipsit membrii marcanți de la Facultatea de Medicină din Iași, de exemplu a Prof. Dr. Ion Enescu (1884-1972), care era internist și Prof. Dr. Grigore T. Popa (1892-1948), care era anatomist. Singurul membru al Societății, care era profesor Facultatea de Medicină din Iași era Butoianu. El, însă, activa în paralel la Iași și la București.

Nu au participat nici câțiva importanți pediatri ai României, de exemplu Prof. Dr. Titu Gane (1883-1956) – care era profesor la Facultatea de Medicină din Cluj.

Ar fi fost util ca în rândul membrilor să fi fost cooptați tineri profesori de educație fizică.

Existența Societății a fost de la început marcată de criza economică, ce afecta întreaga țară la începutul anilor '30.

Concluzii

Întemeierea în 1932, la București, a Societății Medicale de Educație Fizică a fost un progres în domeniul organizării educației fizice pe criterii medicale.

Chiar de la începutul existenței sale această organizație a dorit să nu fie limitată la arealul Capitalei, ci și-a propus să cuprindă medici din diverse regiuni ale României. Acest deziderat nu a putut fi atins atunci.

În această Societate au fost membri atât medici celebri din anii '30, cât și tineri medici, ceea ce a permis un dialog al generațiilor pe problemele de educație fizică medicală.

Prezența Prof. Dr. Iuliu Hațieganu, ca membru de onoare a Societății, a fost o confirmare a importanțelor sale activității de domeniul educației fizice medicale.

Un alt aspect pozitiv a fost cooptarea atât a medicilor civili, cât și a unor medici militari.

Conflicte de interes

Nu există.

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RECENT PUBLICATIONS ACTUALITĂȚI EDITORIALE

New Romanian publications in the field of sports Publicații românești recente în domeniul sportului

Turism și agrement sportiv

Ioan Băca, Horea Ștefănescu
Editura Napoca Star, Cluj-Napoca, 2014
407 pagini

Lucrarea este destinată, în special, studenților și maezrilor de la facultățile de Geografie și Educație Fizică și Sport, dar și celor care iubesc sportul, agrementul în aer liber, natura, aventura și cultura; celor care doresc să-și mențină și să-și îmbunătățească sănătatea și condiția fizică; animatorilor, ghizilor și instructorilor de activități sportive agrementale; celor care organizează evenimente de turism activ și sportiv, specialiștilor, organizațiilor care elaborează proiecte de amenajare și de valorificare turistică a unor teritorii.

În elaborarea acestei lucrări autorii au parcurs mai mulți pași metodologici:

- consultarea unei vaste bibliografii referitoare la sport ca activitate competițională și de relaxare, la turismul sportiv și la numeroasele sporturi care au conotații turistice și agrementale;

- vizionarea unui număr mare de clipuri și filme documentare pentru a observa caracteristicile tehnice ale diferitelor activități de turism sportiv și condițiile în care acestea se desfășoară;

- selectarea materialului grafic în funcție de calitatea și relevanța sa (fotografii, schițe, hărți) și intervenția asupra sa, în anumite cazuri, pentru a-l face mai explicit;

- efectuarea unor cercetări pe teren, în România și în alte țări (Franța, Italia, Germania, Estonia etc.), asupra unor activități sportive cu caracter agremental pentru a observa comportamentul sportivilor, tehnicile folosite, implicațiile fizice și emoționale, precum și impactul acestora asupra mediului.

Supercampionii Clujului

Ovidiu Blag
Editura Colorama, Cluj-Napoca, 2014
720 pagini

Cartea „Supercampionii Clujului” este o introspecție în viața unor oameni care au făcut cu adevărat ceva pentru sport. De-a lungul a 700 de pagini cititorii vor putea descoperi poveștile a 38 de supercampioni, nu doar ai Clujului, dar ai întregului sport românesc. Pentru că fiecare din cele 38 de personaje prezentate în acest volum a scris pagini de glorie în sportul românesc:

Dan Anca (fotbal), Ioan „Neluță” Bănda (volei), Mircea Barna (baschet), Ștefan Covaci (fotbal), Mihai Adam (fotbal), Constantin Bengheanu (volei), Vasile Mîrza (box), Ioan Ovidiu Sabău (fotbal), Farkas Paneth (tenis de masă), Nicolae Szoboszlai (fotbal), Claudiu Rusu (polo), Laura Moise (judo), Carol Raduly (suliță), Gheorghe Roman (baschet),

Tunde Enyedi (baschet), Aurora Dragoș (baschet), Dorin Giurgiuca (tenis de masă), Sergiu Suciu (tenis de masă), Ciprian Porumb (tenis), Mircea Cristescu (baschet), Florin Purice (fotbal-tenis), Petre Motrescu (rugby), Iosif Mihalik (box), Șerban Doboși (tenis de masă), Remus Câmpeanu (fotbal), Vasile Bogdan (atletism), Augustin Țegean (fotbal), Alexandru Turei (box), Vasile Sărucan (săritura în lungime), Matei Ruhring (baschet), Simona Richter (judo), Eva Zörgo (suliță), Cornel Porumb (atletism), Maria Merca Bagiu (baschet), Vasile Dobrău (fotbal), Florin Berceanu (judo), Magda Jerebie (baschet) și Radu Negulescu (tenis de masă) sunt „Supercampionii Clujului” despre care aveți ce citi în cele aproape 700 de pagini ale volumului.

Despre carte îi las pe alții să vorbească, dar vreau să aduc un elogiu personajelor ei. Sunt acolo 38 de oameni care au făcut cu adevărat ceva pentru sportul românesc, niște oameni în fața cărora mă înclin, iar pentru cei care sunt acum în Ceruri, mă rog. Cu siguranță că vor fi voci care vor spune că mai există și alți oameni care au făcut cu adevărat ceva în sport, ori ei nu sunt prezenți în cartea mea. Fac precizarea, însă, că această carte a strâns la un loc o serie de 38 de interviuri cu personalități din lumea sportului cu care eu am stat de vorbă, volumele neavând pretenția că ar cuprinde toată lumea sportului clujean. Probabil, cu altă ocazie, și într-o colaborare necesară cu alți jurnaliști (pentru că volumul de muncă ar fi imens), vom reuși să scoatem și o astfel de lucrare laborioasă, a declarat Ovidiu Blag, autorul volumului.

Alergăm pentru sănătate

Silviu Dumitrescu
Editura Pentru Sport, București, 2014
220 pagini

Cartea antrenorului emerit Silviu Dumitrescu, personalitate binecunoscută în lumea sportului de performanță, este o invitație, argumentată științific, pentru alergare, jogging, pentru obținerea și menținerea sănătății.

Cartea se adresează atât amatorilor, cât și celor avansați, evidențiind rolul benefic al mișcării fizice în viața omului contemporan, amenințat de efectele nocive ale civilizației.

Lucrarea reflectă experiența uriașă a autorului, acumulată în peste 50 de ani în acest domeniu, exprimată într-un stil atractiv, cuprinzând teme cum ar fi :

Joggingul poate slăbi, dar și îngrașă! Puțină fiziologie pe înțelesul tuturor. Despre sex și efortul sportiv. Pregătirea începătorilor dar și a avansaților. Despre alimentație, colesterol, E-urile alimentare, calorii, vitamine, enzime etc.

Lucrarea este pigmentată cu schițe și fotografii prezentate într-un mod umoristic, ceea ce face lectura mult mai ușoară și mai plăcută.

Leon Gombos
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Book reviews Recenzii cărți

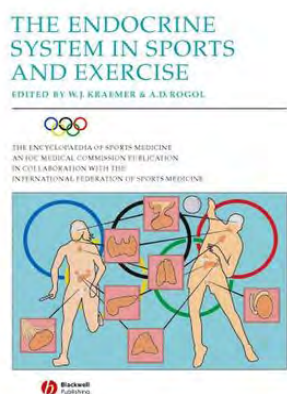
The Encyclopaedia of Sports Medicine: An IOC Medical Commission Publication in Collaboration with The International Federation of Sports Medicine, Volume XI, The Endocrine System in Sports and Exercise

(Enciclopedia medicinei sportive: o publicație a Comisiei Medicale a CIO, în colaborare cu Federația Internațională de Medicină Sportivă, volumul XI, Sistemul Endocrin în Sport și Efortul Fizic)

Editori: William J. Kraemer & Alan D. Rogol

Editura: Wiley-Blackwell, iunie 2014

648 pagini; Preț: € 420,00



Deși este vorba de o reeditare a primei apariții, din 2005, întrucât n-am avut ocazia s-o facem atunci, dar și datorită valorii deosebite a conținutului, editorilor și contributorilor săi, cartea anunțată mai sus ne obligă s-o semnalăm cititorilor noștri. Cititori-specialiști care, cu siguranță, ar avea numai de câștigat prin parcurgerea textului său; la urma urmei o reeditare vorbește prin ea însăși, nu-i așa? În felul acesta, iată, în două numere succesive ale revistei noastre, vorbim despre cărți monumentale, apărute sub egida Comisiei Medicale a CIO care, cu adevărat laudabil, în cei peste 25 de ani de la inițierea seriei *Enciclopedia Medicinei Sportive*, prin statutul de care se bucură în rândul specialiștilor din lumea științelor sportului, reușește să-i capeteze pe cei mai valoroși dintre ei, pentru proiectele sale editoriale.

La vremea inițierii proiectului și a lansării sale „pe piață”, cartea pe care o semnalăm venea să umple un gol ținând cont că, așa cum menționează și prefațatorul lucrării - nimeni altul decât Dr. Jacques Rogge, președintele CIO la acea dată - după ce lucrările anterioare se aplecaseră asupra restului aspectelor esențiale ale biologiei performanței umane, era logic ca acest al XI-lea volum al amintitei serii, să fie dedicat glandelor, deoarece „ele produc hormonii ce modifică și controlează atât de multe dintre importante funcții ale corpului nostru”, iar „un mare număr dintre efectele cronice ale antrenamentului fizic, se concretizează, în ultima instanță, în modificări adaptative majore ale funcțiilor endocrine”.

În ultimele două decenii ale mileniului trecut, câmpul de studiu al endocrinologiei sportive cunoscuse un ritm realment alert de dezvoltare și acumulări de cunoștințe și clarificări; dovadă faptul că în perioada respectivă numărul articolelor listate pe PubMed crescuse de peste 30 de ori. Iar, cum era de așteptat ca un interes și un ritm similar să se mențină și în decadele ulterioare, editorii le-au cerut autorilor diverselor capitole să ofere, în cadrul lor, nu doar o aducere la zi a cunoștințelor existente, ci și o proiecție către viitor, un model al evoluției cercetării în domeniu, în anii ce urmau să vină, așa cum vedeau ei că ar fi de așteptat, sau necesar, să se întâmple. De altfel, în cercetarea de top, în care erau implicați fără doar și poate toți cei invitați să colaboreze, asemenea încercări de a intui viitoarele tendințe și dezvoltări, sau de a identifica direcțiile și nevoile viitoare, reprezintă ceva obișnuit, însă de regulă cercetătorii se referă strict la „feliuța” lor, la aspectele înguste în care ei sunt implicați, interesați și experți. Or, prin faptul că fiecare dintre cei 71 de contributori au venit cu astfel de proiecții, rezultând o colecție impresionantă de asemenea opinii și propuneri, editorii își exprimau speranța că „enciclopedia” lor va oferi nu doar cea mai valoroasă și completă informație privind endocrinologia sportivă, ci și un cadru conceptual orientat spre viitor, care să direcționeze și în același timp să inspire cercetarea din domeniu.

Cititorii acestei rubrici a Palestricii știu că, de regulă, recenziile noastre de carte sunt destul de consistente, ca număr de pagini și bogăție a informației. Ceea ce nu va fi cazul și de această dată, pentru simplul motiv că, din fericire, cartea asupra căreia ne-am oprit atenția poate fi accesată gratuit, în întregime, intrând pe site-ul: <http://www.imd.inder.cu/adjuntos/article/602/The%20Endocrine%20System%20in%20Sports%20and%20Exercise.pdf>.

Drept urmare, în încheiere, îndemnându-i pe cei interesați să profite de această nesperată și poate trecătoare oportunitate, vom spune doar că „enciclopedia” debutează cu o trecere în revistă a principiilor și conceptelor din endocrinologie, după care îl poartă pe cititor prin capitole dedicate diferitelor glande endocrine, pe care le abordează din toate perspectivele posibile. Sunt examinate în continuare efectele interactive ale influențelor hormonale asupra sistemului imunitar, muscular și osos, ca și interacțiunile cu alimentația, unul dintre cele mai importante și controversate aspecte ale performanței sportive. Deși încă plină de necunoscute (datorită dificultății de a studia sportivii în chiar timpul confruntărilor reale), nu este uitată problema răspunsului hormonal la stresul specific, care nu are cum să nu poarte și amprenta acțiunii diversilor factori de stres de natură ambientală. Demne de un interes special din partea celor implicați direct, ca practicieni, în sport, sunt și capitolele alocate unor subiecte de care te poți lovi la tot pasul: supraantrenamentul, procesul de creștere și dezvoltare la sportivii copii și juniori, sau anabolizantele.

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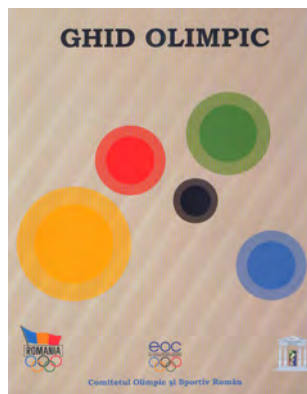
Ghid olimpic

(Olympic Guide)

Editori: Laura Gabriela Cârlesc-Badea

Editura: RA Monitorul Oficial, 2013

188 pagini



Ghid olimpic este o apariție tipografică inedită, editată în anul 2013 de către Comitetul Olimpic și Sportiv Român, cu sprijinul Asociației Comitetelor Olimpice Europene.

Coordonator al colecției de texte este campioana olimpică Laura Gabriela Cârlesc-Badea, director al Academiei Olimpice Române.

Echipa de Editori coordonatori sunt Laura Gabriela Cârlesc-Badea și Anita Diana Sterea.

La editarea volumului au colaborat Arthur Hoffmann, Mihaela Mioc, Maria Băleanu, Diana Birtalan, Alexandra Dospinescu.

Curcile olimpice sunt simbolizate pe prima copertă a cărții alături de siglele COSR, AOR și cea a Comitetului Olimpic European. Ultima copertă prezintă crezul autorilor referitor la Olimpism. „Prin acest „Ghid Olimpic” ne propunem să evidențiem impactul pe care Olimpismul îl are asupra societății moderne și să arătăm că sportul este creator de bine frumos și adevăr”.

Ghidul tipărit în condiții excepționale și atractiv pentru cititorii copii sau adulți sugerează respect pentru ideea Olimpică și remarcabilele performanțe românești la Jocurile Olimpice și întreaga mișcare sportivă românească.

Conținutul lucrării lămurște cititorul și-l ajută să înțeleagă fenomenul sportiv și Olimpic în contextul psihosocial, istoric, geografic, simbolistic etc.

Titlurile și subtitlurile la care am făcut referire sunt următoarele:

Cap. I. Jocurile Olimpice antice; Legende mituri ale originii; Jocurile circuit organizate în Grecia antică; Jocurile Olimpice antice; Programul și probele întrecerilor olimpice; Premiarea învingătorilor la Jocuri; Jocurile Olimpice și arta; Apusul Jocurilor Olimpice antice.

Cap. II. Renașterea Jocurilor Olimpice; Evanghelie Zappa; Pierre de Coubertin și visul său; Olimpism; Protecția mediului înconjurător, educația în acest spirit.

Cap. III. Mișcarea Olimpică; Comitetul Internațional Olimpic; Misiunea și rolul Comitetului Internațional Olimpic; Președinții Comitetului Internațional Olimpic; Membrii Comitetului Internațional Olimpic; Sesiunile Comitetului Internațional Olimpic; Congresul Olimpic;

Comisiile Comitetului Internațional Olimpic; Solidaritatea Olimpică; Sponsorizarea Mișcării Olimpice; Federațiile Sportive Internaționale; Comitetele Naționale Olimpice; Asociația Comitetelor Naționale Olimpice; Academia Internațională olimpică; Ziua Olimpică; Muzeul Olimpic.

Cap. IV. Jocurile Olimpice moderne și Simbolurile Olimpice; Jocurile Olimpice de vară; Jocurile Olimpice de iarnă; Jocurile Olimpice pentru Tineret; Festivalul Olimpic al Tineretului European; Jocurile Europene; Simbolurile Olimpice; Simbolul Olimpic; Deviza Olimpică; Crezul Olimpic; Drapelul Olimpic; Jurământul Olimpic; Flacăra Olimpică și Ștabela Jocurilor Olimpice; Imnul Olimpic; Ceremonialuri ale Jocurilor Olimpice; Satul Olimpic; Mascotele Olimpice; Pictogramele Olimpice.

Cap. V. România Olimpică; Înființarea Comitetului Olimpic Român; Președinți ai Comitetului Olimpic Român în perioada 1914-2013; Membrii C.I.O. pentru România; Academia Olimpică Română; Academia Olimpică de Excelență; Ziua și Luna Olimpică; România la Jocurile Olimpice de vară; România la Jocurile Olimpice de iarnă; Rezultatele delegației României la Jocurile Olimpice pentru Tineret.

Cap. VI. Activități practice.

Informațiile oferite cititorilor pe parcursul celor 188 de pagini sunt completate cu alte cinci pagini reflectând poze ale medaliaților Olimpici Români.

Sursele bibliografice utilizate sunt colecții de documente publicate, dicționare, enciclopedii, memorii și mărturisiri, lucrări și articole speciale, pagini de web, manuale și programe de educație Olimpică și fotografii și activități.

După cum se cuvine nu sunt neglijați sponsorii principali ai COSR.

Conținutul capitolelor și subcapitolelor sunt rezumate ale unor lucrări ample și aduc cititorilor și voluntarilor în domeniul Olimpismului informațiile pertinente, necesare pentru a face sens în viața cotidiană.

Plecând de la legendele și miturile originilor, subiectele abordate urmează o logică succesiune temporală până la problematica națională în ceea ce privește performanța și educația Olimpică.

Lecturarea informațiilor scrise elocint și într-un ritm alert scanează toate edițiile Jocurile Olimpice de vară și de iarnă relevă informațiile specifice ale Jocurilor.

Caracteristicile naționale ale țărilor care au organizat J.O. sau ale sportivilor participanți sunt simbolizate prin mascotele prezentate explicit și cu simpatie.

Pozele de arhivă sau cele contemporane, realizate cu profesionalism însoțesc ideile exprimate și le dau viață prin aduceri aminte a emoțiilor provocate de succesele Olimpice românești.

Un capitol cu totul aparte îl constituie sectorul de activități practice destinate cu precădere copiilor. Jocurile și concursul „Cine știe Olimpism câștigă”, jocurile de cuvinte încrucișate sau cele de colorat aduc în universul copiilor și-i familiarizează pe aceștia cu mișcarea sportivă și Olimpică.

Ghidul Olimpic constituie o carte de căpătâi pentru toți iubitorii mișcării Olimpice și pentru părinții, care doresc să-și educe copiii în spirit de Fair Play, dragoste de natură, demnitate și onoare, cu sănătate și optimism.

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SCIENTIFIC MANIFESTATIONS MANIFESTĂRI ȘTIINȚIFICE



UMF
UNIVERSITATEA DE
MEDICINĂ ȘI FARMACIE
IULIU HAȚIEGANU
CLUJ-NAPOCA



Societatea Medicală Română
de Educație Fizică și Sport



A doua Conferință Națională de Medicină Aplicată la Educația Fizică și Sport 2nd National Conference of Applied Medicine in Sport and Physical Education

În perioada 8-10 mai 2014 s-a desfășurat în Aula Magna „Iuliu Hațieganu” (și săli alăturate) a Universității de Medicină și Farmacie „Iuliu Hațieganu” din Cluj-Napoca „A doua Conferință Națională de Medicină Aplicată la Educația Fizică și Sport”.

Conferința a dat ocazia medicilor, profesorilor de educație fizică, cercetătorilor științifici din domeniu, sociologilor, dieteticienilor și a altor specialiști să prezinte lucrări științifice legate de tematica stabilită.

Comparativ cu prima ediție a conferinței, se remarcă creșterea numărului de secțiuni (de la patru la șase), la care se adaugă organizarea tot în cadrul conferinței al Simpozionului „Moment aniversar dr. doc. Petru Derevenco”, al Simpozionului „Relația medici școlari-profesori de educație fizică”, a Acțiunii Metodice a Profesorilor de Educație fizică, precum și a workshop-urilor. Pe durata lucrărilor au fost susținute 44 de comunicări științifice, trei conferințe, o lecție demonstrativă de gimnastică aerobică dublată de o prezentare teoretică, 6 workshopuri, o secțiune poster și 3 simpozioane,

Lucrările conferinței au fost deschise de Prof. Dr. Traian Bocu, care a invitat la cuvânt pe Prof. Dr. Marcel Pop, Prorectorul Universității „Babeș-Bolyai” din Cluj-Napoca, pentru transmiterea salutului Rectorului UBB și urarea de succes participanților. Prof. Dr. Vasile Bogdan, Decan al Facultății de Educație Fizică și Sport a Universității „Babeș-Bolyai” din Cluj-Napoca a exprimat salutul și urările de succes lucrărilor Conferinței din partea acestei facultăți, a menționat nivelul ridicat al lucrărilor ediției precedente. În continuare, Prof. Dr. Ștefan Florian, președintele Senatului Universității de Medicină și Farmacie „Iuliu Hațieganu” din Cluj-Napoca a transmis salutul Senatului și al Rectorului UMF, iar, în continuare, a deschis Simpozionul *Moment aniversar - Dr. Doc. Petru Derevenco - 90 ani*. În cadrul acestui Simpozion, i-a fost înmănată Dr. Doc. Petru Derevenco, medalia „Iuliu Hațieganu”, pentru întreaga activitate desfășurată în cadrul Universității de Medicină și Farmacie.

A urmat *Simpozionul Relația Medici școlari - Profesori de educație fizică* cu tema *Promovarea și menținerea unei stări optime de sănătate a populației școlare și favorizarea proceselor de creștere și dezvoltare fizică armonioasă, prin activități fizice*.

În continuare, Conf. Dr. Simion Bran, de la Facultatea de Medicină dentară, a susținut conferința: *Chirurgia ortognatică între funcționalitate și estetică*.

Programul zilei de joi a continuat cu Secțiunea I, intitulată *Educație fizică școlară și universitară - Pediatrie socială*, moderată de Șef. Lucrări Dr. Tudor Pop, Șef Lucrări Dr. Bianca Simionescu și Șef Lucrări Dr. Maria Aluș.

În paralel cu această secțiune, în sala de sport a UMF s-a desfășurat acțiunea metodică a profesorilor de educație fizică, cu participarea cadrelor didactice din școlile județului Cluj. Cu interes a fost urmărită prezentarea practică a profesoarei Mariana Radvany de la Palatul Copiilor care a ținut o lecție deschisă de gimnastică aerobică, urmată de prezentarea teoretică a Șef Lucrări Dr. Corenelia Popovici-Suciu. La aceeași oră a avut loc un workshop în amfiteatrul Clinicii Medicale IV, intitulat *Actualități în medicina sportivă*, condus de Conf. Dr. Vasile Negrean.

Prima zi s-a încheiat cu un cocktail - deschidere, unde participanții s-au bucurat de prezența mezzosopranei Lavinia Bocu, aceasta interpretând muzică din filme.

A doua zi lucrările au continuat cu secțiunea a II-a *Sport de performanță – Refacere Medicină sportivă*, moderată de Conf. Dr. Vasile Negrean, Prof. Dr. Dan Riga și Conf. Dr. Nicolae Neagu. S-a remarcat lucrarea *Cuantificarea efortului în pregătirea fizică, prin dirijarea computerizată a tempourilor de alergare*, susținută de Nicolae Neagu.

În paralel cu această secțiune a avut loc și secțiunea Poster, unde s-au remarcat lucrările: *Studiu privind bugetul de timp a studenților Universității din București alocat activităților motrice de timp liber - autori Remus Dumitrescu și Daniela Aducovschi și Estimarea activității fizice la un lot de studenți din România în relație cu starea*

de nutriție și performanța universitară - autori Bogdana Năsui și Codruța Popescu.

În cursul zilei de vineri au avut loc un număr de 5 workshopuri de interes pentru participanți. Acestea au fost următoarele: Nutriția - Medicina Viitorului, coordonat de Prof. Dr. Doina Miere și Conf. Dr. Lorena Filip; Kinetoterapia în tulburările de statică vertebrală la copil coordonat de Conf. Dr. Ioan Onac, desfășurat în amfiteatrul Clinicii de Recuperare; Optimizarea performanței sportive prin antrenament biofeedback. Relația activare – performanță coordonat de Lector Dr. Marius Crăciun; Programele de promovare a sănătății salariaților (P-PSS) coordonat de Conf. Dr. Gheorghe Dumitru; Ritmuri Latino pentru promovarea sănătății - Salsa și Bachata, coordonat de Șef lucrări Dr. Mihai Kiss.

Simpozionul *Palestrica Mileniului III – Civilizație și sport - 15 ani*, a fost prezentat de Prof. Dr. Traian Bocu, Redactor șef al revistei, de la înființare și în prezent și Demostene Șofron membru al Boardului editorial, care au reamintit momentele importante ale evoluției revistei.

Conferința susținută de Acad. Prof. Dr. Nicolae Hâncu *Stilul de viață, sănătate, longevitate*, prin noutățile prezentate la această temă a atras atenția în mod deosebit.

Secțiunea a III-a *Sport pentru toți - Fiziologia efortului fizic - Stres - Programe de promovare a sănătății salariaților* a fost moderată de Conf. Dr. Gheorghe Dumitru, Conf. Dr. Iulia Balint și Conf. Dr. Adriana Albu.

S-au remarcat lucrările prezentate de colectivul de la Spitalul de Recuperare.

Secțiunea a IV-a *Riscuri în activitatea sportivă - Tratamente - Recuperare* a avut ca moderatori pe Conf. Dr. Ioan Onac, Șef lucrări Dr. Rodica Ungur și Conf. Dr. Gheorghe Tomoaia. S-au remarcat lucrările Conf. Dr. Ioan Onac, Șef Lucr. Dr. Rodica Ungur și Conf. Dr. Gheorghe Tomoaia.

Ultima zi a lucrărilor a început cu secțiunea a V-a, *Psihologia activităților fizice - Psihologia sportului - Medicină psihosomatică*, a cărei moderatori au fost Prof. Dr. Dan Dumitrașcu, Prof. Dr. Emilia Grosu și Prof. Dr. Sorin Riga.

Secțiunea a VI-a *Calitatea vieții - Nutriție - Igienă - Sănătate publică - Sănătate mintală*, moderată de Prof. Dr. Monica Popa, Conf. Dr. Valeria Laza și Conf. Dr. Cristian Bârsu a prezentat un deosebit interes, evidențiindu-se lucrările *Modularea oboselii mentale și a energiei mentale, sub acțiunea Coenzimei Q10 în stresul fizic acut* de Ramona Jurcău și Ioana Jurcău, precum și *Calitatea vieții adolescenților diagnosticați cu hemofilie cu vârste între 13-16 ani* de Letiția Tincuța Aluș și Maria Aluș.

Majoritatea prezentărilor au fost urmate de discuții cu caracter interactiv între participanți.

În încheiere Prof. Dr. Traian Bocu a apreciat lucrările conferinței, mulțumind participanților pentru contribuția lor valoroasă la reușita acestei activități.



Sediul noului amfiteatru „Juliu Hațieganu”, locația desfășurării Conferinței Naționale de Medicină Aplicată la Educația Fizică și Sport.



Festivitatea de deschidere a Conferinței, oficiată de Președintele Senatului Universității de Medicină Prof. Dr. Ștefan Florian. Alături (dreapta), invitații speciali Prof. Dr. Marcel Pop, Prorectorul UBB și Prof. Dr. Vasile Bogdan, Decanul FEFS Cluj .



Secvență din timpul lucrărilor.



Unul dintre participanții de valoare ai Conferinței, Acad. Prof. Dr. Nicolae Hâncu.



Doi dintre moderatorii Conferinței, Șef. Lucr. Dr. Tudor L. Pop și Șef Lucr. Maria Aluș.



Secvență din timpul programului artistic oferit la Cocktailul de deschidere a Conferinței.



Simpozionul „Gheorghe Moceanu”, 12 iunie 2014 (6) “Gheorghe Moceanu” Symposium, 2014, June 12 (6)

Cea de a șasea ediție a Simpozionului *Gheorghe Moceanu* a fost organizat, ca de obicei, de Inspectoratul Școlar Județean Cluj în colaborare cu Facultatea de Educație Fizică și Sport din cadrul Universității Babeș-Bolyai și Societatea Medicală Română de Educație Fizică și Sport, prin implicarea revistei *Palestrica Mileniului III*, la Școala Gimnazială *Avram Iancu* din Turda.

Simpozionul a reunit membrii Cercurilor metodice ale profesorilor de educație fizică din întreg județul Cluj (Cluj-Napoca, Dej, Turda, Câmpia Turzii, Gherla, Huedin).

Ca invitați speciali au fost: Prof Ioan Mureșan, fostul Director al Școlii Liviu Rebreanu și fost șef al Cercului metodic al profesorilor de educație fizică din județul Cluj, Conf. Dr. Septimiu Ormenișan de la FEFS Cluj Napoca, Ioan Căținaș, fostul Inspector școlar județean și Prof. Dr. Traian Bocu, redactor șef al revistei *Palestrica Mileniului III - Civilizație și sport*.

Deschiderea Simpozionului a fost făcută de Directorul Școlii gimnaziale *Avram Iancu*, Prof. Ioan Groza și de Directoarea adjunctă Prof. Liana Stan. Simpozionul a fost moderat de Inspectorul Școlar de specialitate Prof. Drd. Cristian Potora. Au fost susținute lucrările selectate pentru a fi prezentate în plen. Acestea au fost următoarele:

- Cristian Munteanu, Lucian Sterescu, Mircea Coldea, Ferezan Florin. Dezvoltarea calităților motrice la vârsta școlară mică;

- Băl Olimpiu. Rolul și locul jocurilor de mișcare în lecția de educație fizică la ciclul primar;

- Maria Sofia Baias, Dan Crăciuneanu. Adaptarea sporturilor de masă pentru recuperarea fizică a elevilor cu dizabilități neuro-motorii;

- Daniel Francisc Gall. Efortul în lecția de educație fizică;

- Anca Rus. Muzeul Olimpic - „Paradisul” virtual al sportului;

- Claudiu Conăiu. Model de lecție de înot pentru grupe eterogene de înot;

- Marcela Gabor, Adrian Condor. „Împreună vom reuși”;

- Laura Ionescu, Sorina Pop. Metoda reciprocă (cu parteneri) în formarea comportamentului pro-social la elevi în cadrul orelor de educație fizică și sport;

- Septimiu Ormenișan. Optimizarea performanței sportive în jocurile sportive prin metoda „Coaching”.

În partea a doua a Simpozionului, au făcut aprecieri și scurte comunicări orale: inspectorul de specialitate Prof. Cristian Potora, Prof. Ilie Dragotă și Prof. Dr. Traian Bocu, după care Inspectorul de specialitate a înmănat diplomele de participare.

Traian Bocu

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EVENTS EVENIMENTE



Crosul Cupa „Gelu Românul” Dăbâca ediția a II-a - 14 iunie 2014 **Cross Cup „Gelu Românul” Dăbâca, 2nd Edition – 2014, June 14**

Ziua de sâmbătă 14 iunie a fost una specială, prin faptul că, pe parcursul acesteia, s-a desfășurat în comuna Dăbâca, jud. Cluj, cea de a II-a ediție a crosului școlar intrajudețean. Organizat sub egida Inspectoratului Școlar Județean Cluj, Școala Gimnazială cu sprijinul Primăriei și Consiliului local Dăbâca (Primar - Valer Petrindean, Viceprimar - Emil Cioban), crosul a adunat la start echipele școlilor din întreg județul Cluj. Considerat cel mai mare cros de primăvară intrajudețean al Școlilor gimnaziale (cel mai mare cros de toamnă fiind cel de la Răchițele), Crosul de la Dăbâca sugestiv intitulat „Cupa Gelu Românul”, a reușit mobilizarea unui mare număr de participanți. Traseul a fost stabilit pe platoul din jurul ruinelor parțial restaurate, ale Cetății lui

Gelu. În urma competiției, clasamentul pe echipe a fost următorul: Locul I - Răchițele, locul II - Râșca, locul III - Dăbâca, dar de fapt câștigători sunt toți elevii participanți, care au înțeles rolul important pe care îl ocupă sportul în viața fiecăruia.

Câștigătorii pe categorii de vârstă au fost următorii: fete cl. III-IV - Moldovan Andreea - Școala Cătina; băieți cl. III-IV - Deac Marius - Școala Cătina; fete cl. V-VI, 11-12 ani - Pop Tabita - Școala Cornești; băieți cl. V-VI, 11-12 ani - Potra Ioan - Școala Răchițele; fete cl. VII-VIII, 13-14 ani - Floca Claudia - Școala Răchițele; băieți cl. VII-VIII, 13-14 ani - Szakacs Stefan - Școala Dăbâca.



Start în proba de cros, băieți 13-14 ani.



Înregistrarea concurenților la sosire.



Cele două echipe ale Școlii din localitatea organizatoare, Dăbâca.



Cupele puse în joc la clasamentul pe echipe.



Festivitate de premiere la una dintre categoriile de băieți efectuată de directoarea școlii din Dăbâca, Prof. Florina Maria Macavei.



Festivitate de premiere la categoria 9-10 ani, efectuată de Inspectorul școlar Prof. Drd. Cristian Potora.

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PORTRETE - Personalități ale științei și culturii românești **PORTRAITS - Personalities of the Romanian science and culture**

Dr. Doc. Petru Derevenco la 90 de aniversări **MD Petru Derevenco at his 90th anniversary**

„*Marii creatori nu au biografie. Biografia lor este opera*” obișnuia să spună George Călinescu. Cuvinte îndreptățite, cuvinte în care se regăsește personalitatea Prof. Dr. Doc. Petre Derevenco, doctor în științe medicale, medic primar, cercetător, membru de onoare al Academiei de Științe Medicale din România. Biografia este opera. În cazul Prof. Dr. Doc. Petre Derevenco, opera înseamnă postularea medicinei stresului/stresologiei și adaptării/adaptologiei din calitate de pionier și fondator al unui domeniu și al unei școli unice în România. Astfel, integrând fiziologia de la medicina omului sănătos, adaptologie, palestrică la efort, suprasolicitare, stres, endocrinologie, cu determinismul psihopatologic de psihosomatică, patologia stres-dependență și psihiatrie, Prof. Dr. Petre Derevenco devine creator de școală, o altă prioritate clujeană.

Operă înseamnă mult, mult mai mult. Înseamnă cercetări multidisciplinare complexe, experimentale și clinice, lucrări științifice prezentate în reuniuni naționale și internaționale, capitole în tratate de profil, monografii, toate priorități naționale. Valoarea lor este dată de abordările multifuncționale, integrative și dinamice în medicina stresului, prin gradientul sănătate-stres-boală, în dimensiunea bio-psiho-socială.

Cărțile publicate – „Efortul și sistemul endocrin”, „Stresul în sănătate și boală”, „Fiziologia efortului în sport”, „Darwin și darwinismul”,... - reprezintă prin conținut, bogăție de

informații, adevărate manuale și ghiduri pentru cercetarea și practica ergonomică, sportivă și medicală. Se adaugă titlurilor mai sus amintite, colaborările la publicații prestigioase de profil cum sînt „Romanian Journal of Physiology”, „Clujul Medical”, „Viața medicală”, „Palestrica Mileniului III. Civilizație și Sport”, „Naturwissenschaften” (Heidelberg), „Agressologie” (Paris), „Journal de Physiologie” (Paris), „Endokrinologie” (Leipzig), „Psychoneuroendocrinology” (Londra), „Medicina dello Sport” (Torino), „Pathophysiology Experimental Therapy” (Moscova),... În fine, activitatea științifică este completată armonios de prezențele Prof. Dr. Doc. Petre Derevenco în diferite reuniuni internaționale pe axa Paris, Londra, Padova, Magdeburg, Dresda, Praga, Budapesta, Moscova, Chișinău, București, Timișoara, Iași, Arad, ...

Acesta este OMUL, acesta este MAGISTRUL Petru Derevenco la 90 de ani, o vârstă frumoasă, o vârstă, să nu surprindă, activă și în prezent. La urma urmei, la acest statut se ajunge numai și numai prin *muncă, seriozitate, implicare, responsabilitate*. Le regăsim pe toate în omul și profesorul care este Petru Derevenco, contribuții importante la realizarea umanității. Și ca o recunoaștere a întregii activități, Conducerea Universității de Medicină și Farmacie Iuliu Hațieganu i-a decernat distincția *Medalia Iuliu Hațieganu*.



Dr. Doc. Petru Derevenco primește distincția *Medalia Iuliu Hațieganu* din partea Prof. Dr. Ștefan Florian, Președintele Senatului UMF Iuliu Hațieganu.



Dr. Docent Petru Derevenco, alături de Prof. Dr. Simona Tache.

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FOR THE ATTENTION OF CONTRIBUTORS

The subject of the Journal

The journal has a multidisciplinary nature oriented toward biomedical, health, exercise, social sciences fields, applicable in activities of physical training and sport, so that the dealt subjects and the authors belong to several disciplines in these fields. The main rubrics are: “Original studies” and “Reviews”.

Regarding “Reviews” the main subjects that are presented are: oxidative stress in physical effort; mental training; psycho-neuroendocrinology of sport effort; physical culture in the practice of the family doctor; extreme sports and risks; emotional determinatives of performance; the recovery of patients with spinal column disorders; stress syndromes and psychosomatics; olympic education, legal aspects of sport; physical effort in the elderly; psychomotricity disorders; high altitude sportive training; fitness; biomechanics of movements; EUROFIT tests and other evaluation methods of physical effort; adverse reactions of physical effort; sport endocrinology; depression in sportsmen/women; classical and genetic drug usage; Olympic Games etc.

Among articles devoted to original studies and researches we are particularly interested in the following: the methodology in physical education and sport; influence of some ions on effort capacity; psychological profiles of students regarding physical education; methodology in sport gymnastics; the selection of performance sportsmen.

Other articles approach particular subjects regarding different sports: swimming, rhythmic and artistic gymnastics, handball, volleyball, basketball, athletics, ski, football, field and table tennis, wrestling, sumo.

The authors of the two rubrics are doctors, professors and educators, from universities and preuniversity education, trainers, scientific researchers etc.

Other rubrics of the journal are: the editorial, editorial news, reviews of the latest books in the field and others that are presented rarely (inventions and innovations, universitaria, preuniversitaria, forum, memories, competition calendar, portraits, scientific events).

We highlight the rubric “The memory of the photographic eye”, where photos, some very rare, of sportsmen in the past and present are presented.

Articles signed by authors from the Republic of Moldova regarding the organization of sport education, variability of the cardiac rhythm, the stages of effort adaptability and articles by some authors from France, Portugal, Canada must also be mentioned.

The main objective of the journal is highlighting the results of research activities as well as the permanent and actual dissemination of information for specialists in the field. The journal assumes an important role regarding the achievement of necessary scores of the teaching staff in the university and preuniversity education as well as of doctors in the medical network (by recognizing the journal by the Romanian College of Physicians), regarding didactic and professional promotion.

Another merit of the journal is the obligatory publication of the table of contents and an English summary for all articles. Frequently articles are published in extenso in a language with international circulation (English, French).

The journal is published quarterly and the works are accepted for publication in the Romanian and English language. The journal is sent by e-mail or on a floppy disk (or CD-ROM) and printed, by mail at the address of the editorial staff. The works of contributors that are resident abroad and of Romanian authors must be mailed to the Editorial staff at the following address:

„Palestrica of the third millennium – Civilization and sport”

Chief Editor: Prof. dr. Traian Bocu

Contact address: palestrica@gmail.com or traian_bocu@yahoo.com

Mail address: Clinicilor street no. 1 postal code 400006, Cluj-Napoca, România

Telephone: 0264-598575

Website: www.pm3.ro

Objectives

Our intention is that the journal continues to be a route to highlight the research results of its contributors, especially by stimulating their participation in project competitions. Articles that are published in this journal are considered as part of the process of promotion in one’s university career (accreditation that is obtained after consultation with the National Council for Attestation of University Titles and Diplomas).

We also intend to encourage the publication of studies and research, that include original relevant elements especially from young people. All articles must bring a minimum of personal contribution (theoretical or practical), that will be highlighted in the article.

In the future we propose to accomplish criteria that would allow the promotion of the journal to superior levels according international recognition.

THE STRUCTURE AND SUBMISSION OF ARTICLES

The manuscript must be prepared according to the stipulations of the International Committee of Medical Journal Editors (<http://www.icmjee.org>).

The number of words for the electronic format:

– 4000 words for original articles;

- 2000 words for case studies;
- 5000-6000 words for review articles.

Format of the page: edited in WORD format, A4. Printed pages of the article will be numbered successively from 1 to the final page.

Font: Times New Roman, size 11 pt.; it should be edited on a full page, with diacritical marks, double spaced, respecting equal margins of 2 cm.

Illustrations:

The images (graphics, photos etc.) should be numbered consecutively in the text, with arabic numbers. They should be edited with EXCEL or SPSS programs, and sent as distinct files: „figure 1.tif”, „figure 2. jpg”, and at the editors demanding in original also. Every graphic should have a legend, written **under** the image.

The tables should be numbered consecutively in the text, with roman numbers, and sent as distinct files, accompanied by a legend that will be put **above** the table.

PREPARATION OF THE ARTICLES

1. Title page: – includes the title of article (maximum 45 characters), the name of authors followed by surname, work place, mail address of the institute and mail address and e-mail address of the first author. It will follow the name of article in the English language.

2. Summary: For original articles a summary structured like this is necessary: (Premize-Background, Obiective-Aims, Metode-Methods, Resultate-Results, Concluzii-Conclusions), in the Romanian language, of maximum 250 words, followed by 3-8 key words (if its possible from the list of established terms). All articles will have a summary in the English language. Within the summary (abstract) abbreviations, footnotes or bibliographic references should not be used.

Premises and objectives. Description of the importance of the study and explanation of premises and research objectives.

Methods. Include the following aspects of the study:

Description of the basic category of the study: of orientation and applicative.

Localization and the period of study. Description and size of groups, sex (gender), age and other socio-demographic variables should be given.

Methods and instruments of investigation that are used.

Results. The descriptive and inferential statistical data (with specification of the used statistical tests): the differences between the initial and the final measurement, for the investigated parameters, the significance of correlation coefficients are necessary. The specification of the level of significance (the value *p* or the dimension of effect *d*) and the type of the used statistical test etc are obligatory.

Conclusions. Conclusions that have a direct link with the presented study should be given.

Orientation articles and case studies should have an unstructured summary (without respecting the structure of experimental articles) to a limit of 150 words.

3. Text

Original articles should include the following chapters which will not be identical with the summary titles: Introduction (General considerations), Hypothesis, Materials and methods (including ethical and statistical informations), Results, Discussing results, Conclusions and suggestions. Other type of articles, as orientation articles, case studies, Editorials, do not have an obligatory format. Excessive abbreviations are not recommended. The first abbreviation in the text is represented first *in extenso*, having its abbreviation in parenthesis, and thereafter the short form should be used.

Authors must undertake the responsibility for the correctness of published materials.

4. Bibliography

The bibliography should include the following data:

For articles from journals or other periodical publications the international Vancouver Reference Style should be used: the name of all authors as initials and the surname, the year of publication, the title of the article in its original language, the title of the journal in its international abbreviation (italic characters), number of volume, pages.

Articles: Pop M, Albu VR, Vişan D et al. Probleme de pedagogie în sport. *Educație Fizică și Sport* 2000; 25(4):2-8.

Books: Drăgan I (coord.). *Medicina sportivă*, Editura Medicală, 2002, Bucureşti, 2002, 272-275.

Chapters from books: Hăulică I, Bălţatu O. Fiziologia senescenţei. In: Hăulică I. (sub red.) *Fiziologia umană*, Ed. Medicală, Bucureşti, 1996, 931-947.

Starting with issue 4/2010, every article should include a minimum of 15 bibliographic references and a maximum of 100, mostly journals articles published in the last 10 years. Only a limited number of references (1-3) older than 10 years will be allowed. At least 20% of the cited resources should be from recent international literature (not older than 10 years).

Peer-review process

In the final stage all materials will be closely reviewed by at least two competent referees in the field (Professors, and Docent doctors) so as to correspond in content and form with the requirements of an international journal. After this stage, the materials will be sent to the journal's referees, according to their profiles. After receiving the observations from the referees, the editorial staff shall inform the authors of necessary corrections and the publishing requirements of the journal. This process (from receiving the article to transmitting the observations) should last about 4 weeks. The author will be informed if the article was accepted for publication or not. If it is accepted, the period of correction by the author will follow in order to correspond to the publishing requirements.

Conflict of interest

The authors must mention all possible conflicts of interest including financial and other types. If you are sure that there is no conflict of interest we ask you to mention this. The financing sources should be mentioned in your work too.

Specifications

The specifications must be made only linked to the people outside the study but which have had a substantial contribution, such as some statistical processing or review of the text in the English language. The authors have the responsibility to obtain the written permission from the mentioned persons with the name written within the respective chapter, in case the readers refer to the interpretation of results and conclusions of these persons. Also it should be specified if the article uses some partial results from certain projects or if these are based on master or doctoral theses sustained by the author.

Ethical criteria

The Editors will notify authors in due time, whether their article is accepted or not or whether there is a need to modify texts. Also the Editors reserve the right to edit articles accordingly. Papers that have been printed or sent for publication to other journals will not be accepted. All authors should send a separate letter containing a written statement proposing the article for submission, pledging to observe the ethics of citation of sources used (bibliographic references, figures, tables, questionnaires).

For original papers, according to the requirements of the Helsinki Declaration, the Amsterdam Protocol, Directive 86/609/EEC, and the regulations of the Bioethical Committees from the locations where the studies were performed, the authors must provide the following:

- the informed consent of the family, for studies in children and juniors;
- the informed consent of adult subjects, patients and athletes, for their participation;
- malpractice insurance certificate for doctors, for studies in human subjects;
- certificate from the Bioethical Committees, for human study protocols;
- certificate from the Bioethical Committees, for animal study protocols.

The data will be mentioned in the paper, in the section Materials and Methods. The documents will be obtained before the beginning of the study. Will be mentioned also the registration number of the certificate from the Bioethical Committees.

Editorial submissions will be not returned to authors, whether published or not.

FOR THE ATTENTION OF THE SPONSORS

Requests for advertising space should be sent to the Editors of the "Palestrica of the Third Millennium" journal, 1, Clinicilor St., 400006, Cluj-Napoca, Romania. The price of an A4 full colour page of advertising for 2012 will be EUR 250 and EUR 800 for an advert in all 4 issues. The costs of publication of a logo on the cover will be determined according to its size. Payment should be made to the Romanian Medical Society of Physical Education and Sports, CIF 26198743. Banca Transilvania, Cluj branch, IBAN: RO32 BTRL 0130 1205 S623 12XX (RON).

SUBSCRIPTION COSTS

The "Palestrica of the Third Millennium" journal is printed quarterly. The subscription price is 100 EUR for institutions abroad and 50 EUR for individual subscribers outside Romania. For Romanian institutions, the subscription price is 120 RON, and for individual subscribers the price is 100 RON. Note that distribution fees are included in the postal costs.

Payment of subscriptions should be made by bank transfer to the Romanian Medical Society of Physical Education and Sports, CIF 26198743. Banca Transilvania, Cluj branch, IBAN: RO32 BTRL 0130 1205 S623 12XX (RON), RO07 BTRL 01,304,205 S623 12XX (EUR), RO56 BTRL 01,302,205 S623 12XX (USD). SWIFT: BTRLRO 22

Please note that in 2010 a tax for each article submitted was introduced. Consequently, all authors of articles will pay the sum of 150 RON to the Romanian Medical Society of Physical Education and Sport published above. Authors who have paid the subscription fee will be exempt from this tax. Other information can be obtained online at www.pm3.ro "Instructions for Authors", at our e-mail address palestrica@gmail.com or at the postal address: 1, Clinicilor St., 400006, Cluj-Napoca, Romania, phone: +40264-598575.

INDEXING

Title of the journal: Palestrica of the third millennium – Civilization and sport

pISSN: 1582-1943; eISSN: 2247-7322; ISSN-L: 1582-1943

Profile: a Journal of Study and interdisciplinary research

Editor: "Iuliu Hațieganu" University of Medicine and Pharmacy of Cluj-Napoca and The Romanian Medical Society of Physical Education and Sports in collaboration with the Cluj County School Inspectorate

The level and attestation of the journal: a journal rated B+ by CNCIS in the period 2007-2011 and certified by CMR since 2003

Journal indexed into International Data Bases (IDB): EBSCO, Academic Search Complete, USA and Index Copernicus, Journals Master List, Poland; DOAJ (Directory of Open Access Journals), Sweden.

Year of first publication: 2000

Issue: quarterly

The table of contents, the summaries and the instructions for authors can be found on the internet page: <http://www.pm3.ro>. Access to the table of contents and full text articles (in .pdf format) is free.

ÎN ATENȚIA COLABORATORILOR

Tematica revistei

Ca tematică, revista are un caracter multidisciplinar orientat pe domeniile biomedical, sănătate, efort fizic, științe sociale, aplicate la activitățile de educație fizică și sport, astfel încât subiectele tratate și autorii aparțin mai multor specialități din aceste domenii. Principalele rubrici sunt: „Articole originale” și „Articole de sinteză”.

Exemplificăm rubrica „Articole de sinteză” prin temele importante expuse: stresul oxidativ în efortul fizic; antrenamentul mintal; psihoneuroendocrinologia efortului sportiv; cultura fizică în practica medicului de familie; sporturi extreme și riscuri; determinanți emoționali ai performanței; recuperarea pacienților cu suferințe ale coloanei vertebrale; sindroame de stres și psihosomatică; educația olimpică, aspecte juridice ale sportului; efortul fizic la vârstnici; tulburări ale psihomotricității; pregătirea sportivă la altitudine; fitness; biomecanica mișcărilor; testele EUROFIT și alte metode de evaluare a efortului fizic; reacții adverse ale eforturilor; endocrinologie sportivă; depresia la sportivi; dopajul clasic și genetic; Jocurile Olimpice etc.

Dintre articolele consacrate studiilor și cercetărilor experimentale notăm pe cele care vizează: metodică educației fizice și sportului; influența unor ioni asupra capacității de efort; profilul psihologic al studentului la educație fizică; metodică în gimnastica sportivă; selecția sportivilor de performanță.

Alte articole tratează teme particulare vizând diferite sporturi: înotul, gimnastica ritmică și artistică, handbalul, voleiul, baschetul, atletismul, schiul, fotbalul, tenisul de masă și câmp, luptele libere, sumo.

Autorii celor două rubrici de mai sus sunt medici, profesori și educatori din învățământul universitar și preuniversitar, antrenori, cercetători științifici etc.

Alte rubrici ale revistei sunt: editorialul, actualitățile editoriale, recenziile unor cărți - ultimele publicate în domeniu, la care se adaugă și altele prezentate mai rar (invenții și inovații, universitaria, preuniversitaria, forum, remember, calendar competițional, portrete, evenimente științifice).

Subliniem rubrica “Memoria ochiului fotografic”, unde se prezintă fotografii, unele foarte rare, ale sportivilor din trecut și prezent.

De menționat articolele semnate de autori din Republica Moldova privind organizarea învățământului sportiv, variabilitatea ritmului cardiac, etapele adaptării la efort, articole ale unor autori din Franța, Portugalia, Canada.

Scopul principal al revistei îl constituie valorificarea rezultatelor activităților de cercetare precum și informarea permanentă și actuală a specialiștilor din domeniile amintite. Revista își asumă și un rol important în îndeplinirea punctajelor necesare cadrelor didactice din învățământul universitar și preuniversitar precum și medicilor din rețeaua medicală (prin recunoașterea revistei de către Colegiul Medicilor din România), în avansarea didactică și profesională.

Un alt merit al revistei este publicarea obligatorie a cuprinsului și a câte unui rezumat în limba engleză, pentru toate articolele. Frecvent sunt publicate articole în extenso într-o limbă de circulație internațională (engleză, franceză).

Revista este publicată trimestrial iar lucrările sunt acceptate pentru publicare în limba română și engleză. Articolele vor fi redactate în format WORD (nu se acceptă articole în format PDF). Expedierea se face prin e-mail sau pe dischetă (sau CD-ROM) și listate, prin poștă pe adresa redacției. Lucrările colaboratorilor rezidenți în străinătate și ale autorilor români trebuie expediate pe adresa redacției:

Revista «Palestrica Mileniului III»

Redactor șef: Prof. dr. Traian Bocu

Adresa de contact: palestrica@gmail.com sau traian_bocu@yahoo.com

Adresa poștală: Str. Clinicilor nr.1 cod 400006, Cluj-Napoca, România

Telefon:0264-598575

Website: www.pm3.ro

Obiective

Ne propunem ca revista să continue a fi o formă de valorificare a rezultatelor activității de cercetare a colaboratorilor săi, în special prin stimularea participării acestora la competiții de proiecte. Menționăm că articolele publicate în cadrul revistei sunt luate în considerare în procesul de promovare în cariera universitară (acreditare obținută în urma consultării Consiliului Național de Atestare a Titlurilor și Diplomelor Universitare).

Ne propunem de asemenea să încurajăm publicarea de studii și cercetări, care să cuprindă elemente originale relevante mai ales de către tineri. Toate articolele vor trebui să aducă un minimum de contribuție personală (teoretică sau practică), care să fie evidențiată în cadrul articolului.

În perspectivă ne propunem îndeplinirea criteriilor care să permită promovarea revistei la niveluri superioare cu recunoaștere internațională.

STRUCTURA ȘI TRIMITEREA ARTICOLELOR

Manuscrisul trebuie pregătit în acord cu prevederile Comitetului Internațional al Editurilor Revistelor Medicale (<http://www.icmjee.org>).

Numărul cuvintelor pentru formatul electronic:

- 4000 cuvinte pentru articolele originale,
- 2000 de cuvinte pentru studiile de caz,
- 5000–6000 cuvinte pentru articolele de sinteză.

Format pagină: redactarea va fi realizată în format A4. Paginile listate ale articolului vor fi numerotate succesiv de la 1 până la pagina finală.

Font: Times New Roman, mărime 11 pt.; redactarea se va face pe pagina întreagă, cu diacritice, la două rânduri, respectând margini egale de 2 cm pe toate laturile.

Ilustrațiile:

Figurile (grafice, fotografii etc.) vor fi numerotate consecutiv în text, cu cifre arabe. Vor fi editate cu programul EXCEL sau SPSS, și vor fi trimise ca fișiere separate: „figura 1.tif”, „figura 2. jpg”, iar la solicitarea redacției și în original. Fiecare grafic va avea o legendă care se trece **sub** figura respectivă.

Tabelele vor fi numerotate consecutiv în text, cu cifre romane, și vor fi trimise ca fișiere separate, însoțite de o legendă ce se plasează **deasupra** tabelului.

PREGĂTIREA ARTICOLELOR

1. Pagina de titlu: – cuprinde titlul articolului (maxim 45 caractere), numele autorilor urmat de prenume, locul de muncă, adresa postală a instituției, adresa poștală și adresa e-mail a primului autor. Va fi urmat de titlul articolului în limba engleză.

2. Rezumatul: Pentru articolele experimentale este necesar un rezumat structurat (Premize-Background, Obiective-Aims, Metode-Methods, Rezultate-Results, Concluzii-Conclusions), în limba română, de maxim 250 cuvinte (20 de rânduri, font Times New Roman, font size 11), urmat de 3–5 cuvinte cheie (dacă este posibil din lista de termeni consacrați). Toate articolele vor avea un rezumat în limba engleză. Nu se vor folosi prescurtări, note de subsol sau referințe.

Premize și obiective: descrierea importanței studiului și precizarea premizelor și obiectivelor cercetării.

Metodele: includ următoarele aspecte ale studiului:

Descrierea categoriei de bază a studiului: de orientare sau aplicativ.

Localizarea și perioada de desfășurare a studiului. Colaboratorii vor prezenta descrierea și mărimea loturilor, sexul (genul), vârsta și alte variabile socio-demografice.

Metodele și instrumentele de investigație folosite.

Rezultatele vor prezenta datele statistice descriptive și inferențiale obținute (cu precizarea testelor statistice folosite): diferențele dintre măsurătoarea inițială și cea finală, pentru parametri investigați, semnificația coeficienților de corelație. Este obligatorie precizarea nivelului de semnificație (valoarea *p* sau mărimea efectului *d*) și a testului statistic folosit etc.

Concluziile care au directă legătură cu studiul prezentat.

Articolele de orientare și studiile de caz vor avea un rezumat nestructurat (fără a respecta structura articolelor experimentale) în limita a 150 cuvinte (maxim 12 rânduri, font Times New Roman, font size 11).

3. Textul

Articolele experimentale vor cuprinde următoarele capitole: Introducere, Ipoteză, Materiale și Metode (inclusiv informațiile etice și statistice), Rezultate, Discutarea rezultatelor, Concluzii (și propuneri). Celelalte tipuri de articole, cum ar fi articolele de orientare, studiile de caz, editorialele, nu au un format impus.

Răspunderea pentru corectitudinea materialelor publicate revine în întregime autorilor.

4. Bibliografia

Bibliografia va cuprinde:

Pentru articole din reviste sau alte periodice se va menționa: numele tuturor autorilor și inițialele prenumelui, anul apariției, titlul articolului în limba originală, titlul revistei în prescurtare internațională (caractere italice), numărul volumului, paginile

Articole: Pop M, Albu VR, Vișan D et al. Probleme de pedagogie în sport. Educația Fizică și Sportul 2000; 25(4):2-8.

Cărți: Drăgan I (coord.). Medicina sportivă aplicată. Ed. Editis, București 1994, 372-375.

Capitole din cărți: Hăulică I, Bălțatu O. Fiziologia senescentei. În: Hăulică I. (sub red.) Fiziologia umană. Ed. Medicală, București 1996, 931-947.

Începând cu revista 4/2010, fiecare articol va trebui să se bazeze pe un minimum de 15 și un maximum de 100 referințe bibliografice, în majoritate articole nu mai vechi de 10 ani. Sunt admise un număr limitat de cărți și articole de referință (1-3), cu o vechime mai mare de 10 ani. Un procent de 20% din referințele bibliografice citate trebuie să menționeze literatură străină studiată, cu respectarea criteriului actualității acesteia (nu mai vechi de 10 ani).

Procesul de recenzare (peer-review)

Într-o primă etapă toate materialele sunt revizuite riguros de cel puțin doi referenți competenți în domeniu respectiv (profesori universitari doctori și doctori docenți) pentru ca textele să corespundă ca fond și formă de prezentare cerințelor unei reviste serioase. După această etapă materialele sunt expediate referenților revistei, în funcție de profilul materialelor. În urma observațiilor primite din partea referenților, redacția comunică observațiile autorilor în vederea corectării acestora și încadrării în cerințele de publicare impuse de revistă. Acest proces (de la primirea articolului până la transmiterea observațiilor) durează aproximativ 4 săptămâni. Cu această ocazie se comunică autorului dacă articolul a fost acceptat spre publicare sau nu. În situația acceptării, urmează perioada de corectare a articolului de către autor în vederea încadrării în criteriile de publicare.

Conflicte de interese

Se cere autorilor să menționeze toate posibilele conflicte de interese incluzând relațiile financiare și de alte tipuri. Dacă sunteți siguri că nu există nici un conflict de interese vă rugăm să menționați acest lucru. Sursele de finanțare ar trebui să

fie menționate în lucrarea dumneavoastră.

Precizări

Precizările trebuie făcute doar în legătură cu persoanele din afara studiului, care au avut o contribuție substanțială la studiul respectiv, cum ar fi anumite prelucrări statistice sau revizuirea textului în limba engleză. Autorii au responsabilitatea de a obține permisiunea scrisă din partea persoanelor menționate cu numele în cadrul acestui capitol, în caz că cititorii se referă la interpretarea rezultatelor și concluziilor acestor persoane. De asemenea, la acest capitol se vor face precizări în cazul în care articolul valorifică rezultate parțiale din anumite proiecte sau dacă acesta se bazează pe teze de masterat sau doctorat susținute de autor, alte precizări.

Criterii deontologice

Redacția va răspunde în timp util autorilor privind acceptarea, neacceptarea sau necesitatea modificării textului și își rezervă dreptul de a opera modificări care vizează forma lucrărilor.

Nu se acceptă lucrări care au mai fost tipărite sau trimise spre publicare la alte reviste. Autorii vor trimite redacției odată cu articolul propus spre publicare, într-un fișier word separat, o declarație scrisă în acest sens, cu angajamentul respectării normelor deontologice referitoare la citarea surselor pentru materialele folosite (referințe bibliografice, figuri, tabele, chestionare).

Pentru articolele originale, în conformitate cu îndeplinirea condițiilor Declarației de la Helsinki, a Protocolului de la Amsterdam, a Directivei 86/609/EEC și a reglementărilor Comisiilor de Bioetică din locațiile unde s-au efectuat studiile, autorii trebuie să prezinte:

- acordul informat din partea familiei, pentru studiile pe copii și juniori;
- acordul informat din partea subiecților adulți, pacienți și sportivi, pentru participare;
- adeverință de Malpraxis pentru medici, pentru cercetările/studiile pe subiecți umani;
- adeverință din partea Comisiilor de Etică, pentru protocolul de studiu pe subiecți umani;
- adeverință din partea Comisiilor de Bioetică, pentru protocolul de studiu pe animale.

Datele vor fi menționate în articol la secțiunea Material și metodă. Documentele vor fi obținute înainte de începerea studiului. Se va menționa și numărul de înregistrare al adeverinței din partea Comisiilor de Etică.

Materialele trimise la redacție nu se restituie autorilor, indiferent dacă sunt publicate sau nu.

ÎN ATENȚIA SPONSORILOR

Solicitările pentru spațiile de reclamă, vor fi adresate redacției revistei "Palestrica Mileniului III", Str. Clinicilor nr. 1, cod 400006 Cluj-Napoca, România. Prețul unei pagini de reclamă full color A4 pentru anul 2012 va fi de 250 EURO pentru o apariție și 800 EURO pentru 4 apariții. Costurile publicării unui Logo pe copertile revistei, vor fi stabilite în funcție de spațiul ocupat. Plata se va face în contul Societății Medicale Române de Educație Fizică și Sport, CIF 26198743. Banca Transilvania, sucursala Cluj Cod IBAN: RO32 BTRL 0130 1205 S623 12XX (LEI).

ÎN ATENȚIA ABONAȚILOR

Revista "Palestrica Mileniului III" este tipărită trimestrial, prețul unui abonament fiind pentru străinătate de 100 Euro pentru instituții, și 50 Euro individual. Pentru intern, prețul unui abonament instituțional este de 120 lei, al unui abonament individual de 100 lei. Menționăm că taxele de difuzare poștală sunt incluse în costuri.

Plata abonamentelor se va face prin mandat poștal în contul Societății Medicale Române de Educație Fizică și Sport, CIF 26198743. Banca Transilvania, sucursala Cluj Cod IBAN: RO32 BTRL 0130 1205 S623 12XX (LEI); RO07 BTRL 01304205 S623 12XX (EURO); RO56 BTRL 01302205 S623 12XX (USD). SWIFT: BTRLRO 22

Precizăm că începând cu anul 2010 a fost introdusă taxa de articol. Ca urmare, toți autorii semnatori ai unui articol vor achita împreună suma de 150 Lei, în contul Societății Medicale Române de Educație Fizică și Sport publicat mai sus.

Autorii care au abonament vor fi scutiți de această taxă de articol.

Alte informații se pot obține online de pe www.pm3.ro „Pentru autori” sau pe adresa de mail a redacției palestrica@gmail.com sau pe adresa poștală: Str. Clinicilor nr.1 cod 400006, Cluj-Napoca, România, Telefon:0264-598575.

INDEXAREA

Titlul revistei: Palestrica Mileniului III – Civilizație și sport

pISSN: 1582-1943; eISSN: 2247-7322; ISSN-L: 1582-1943

Profil: revistă de studii și cercetări interdisciplinare

Editor: Universitatea de Medicină și Farmacie „Iuliu Hațieganu” din Cluj-Napoca și Societatea Medicală Română de Educație Fizică și Sport, în colaborare cu Inspectoratul Școlar al Județului Cluj

Nivelul de atestare al revistei: revistă acreditată în categoria B+ de CNCS în perioadele 2007-2011 și atestată CMR din anul 2003 și în prezent

Revistă indexată în Bazele de Date Internaționale (BDI): EBSCO, Academic Search Complete, USA și Index Copernicus, Journals Master List, Polonia, DOAJ (Directory of Open Access Journals), Sweden

Anul primei apariții: 2000

Periodicitate: trimestrială

Cuprinsul, rezumatele și instrucțiunile pentru autori se găsesc pe pagina de Internet: <http://www.pm3.ro> Accesul la cuprins și articole în extenso (în format .pdf) este gratuit.



TALON DE INDIVIDUAL DE ABONAMENT 2014

„PALESTRICA MILENIULUI III – CIVILIZAȚIE ȘI SPORT”

4 NUMERE / 2014 – 100 lei

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Plata se va face în contul Societății Medicale Române de Educație Fizică și Sport, CIF 26198743, Banca Transilvania, Cluj, IBAN: RO32 BTRL 0130 1205 S623 12XX (LEI), SWIFT: BTRLRO 22, cu specificația „Abonament la revista Palestrica Mileniului III”.

Vă rugăm anexați xerocopia dovezii de achitare a abonamentului, de talonul de abonament și expediați-le pe adresa redacției, în vederea difuzării revistelor cuvenite.

„PALESTRICA MILENIULUI III – CIVILIZAȚIE ȘI SPORT”

este o revistă recunoscută de CNC SIS și este luată în considerare în vederea avansării didactice. De asemenea, revista este acreditată de către Colegiul Medicilor din România. Un abonament anual beneficiază de 5 credite.

TALON DE ABONAMENT 2014

„PALESTRICA MILENIULUI III – CIVILIZAȚIE ȘI SPORT”

4 NUMERE / 2014 – 100 lei

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