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EDITORIAL

The importance of physical activities for prevention in healthcare
Importanţa activităţilor fizice pentru prevenţia în sănătate

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The topic of physical activities for prevention in healthcare has been addressed before in the editorials of our journal, but due to its importance and high current interest, we discuss it here again.

The subject of prevention in healthcare is of major importance for the Romanian population. The costs for prevention activities in healthcare that benefit healthy persons are lower than the costs for treatments administered to sick people. Prevention in healthcare, i.e. the mission of promoting and maintaining health, through declared objectives, is assumed by several institutions, both governmental and private non-governmental, non-profit organizations. The governmental institutions are the following: the Ministry of Health, the Ministry of National Education and Research, and the Ministry of Youth and Sports. Each of the mentioned sectors contributes to prevention in healthcare with its own infrastructure, specific human resources and part of financial resources. For the achievement of objectives, an intersectoral collaboration between the state institutions involved in healthcare prevention policy is required. Besides the practice of physical activities, prevention in healthcare also involves activities related to the population's diet and nutrition, in close correlation with these. This is why the contribution of the Ministry of Agriculture to the financing of physical activities for prevention in healthcare is necessary. Also, prevention in healthcare requires the development of a diversified infrastructure, in relation to the existing population. Because this is achieved based on medium-term and long-term projects, an important role is played by the Ministry of Regional Development and Public Administration. The financial support of sports activities for prevention in healthcare can also use local budgets or sponsorships.

Taking into account physical activities as part of the general activities for prevention in healthcare, it can be seen that these are included in the missions of the first three mentioned entities: the regular practice of physical activities is recommended to the population by epidemiologists and family physicians as part of primordial and primary prevention; the practice of physical education and sports and extracurricular sports activities is comprised in the school and university curriculum; and physical activity practice by the population outside the education system in particular is found in sport for all programs.

The development of the infrastructure required for the practice of physical activities by the entire population, and the management or the organization of these activities at central and local level using the existing infrastructure are two of the variables that should be considered by decision makers regarding prevention in healthcare.

The available infrastructure must allow a diversified practice of physical activities, according to the citizens' options. The reference urban indicators for the calculation of the necessary surface areas are those used in architecture and construction, depending on the number of the population, and require a minimum of 5 sq m/inhabitant for the development of sports facilities in urban environment. The necessary infrastructure can be ensured by launching medium-term and long-term national or regional strategic programs, financially sustainable through a co-financing formula.

For example, at first glance it can be easily seen that there is an infrastructure deficit in the category of medium-size (25 m) indoor swimming pools, for school and public use, built by groups of schools, districts, sectors. Studies have shown that this deficit in Cluj-Napoca is estimated at 16 public- sized swimming pools with a surface area of 600 sq m. In the entire Cluj county, this deficit translates into the need for 46 public swimming pools, distributed in the 5 main towns and in the principal communes of the county. We mention that this is an ideal calculation, according to which 0.04 sq m indoor pools are assigned to each citizen (of the 5 sq m attributed to each inhabitant). The construction of these swimming pools could be the object of a long-term strategic project, annually supported by intersectoral collaboration, which might ensure the necessary facilities mentioned above to the stable population of the county, amounting to 690,100 citizens.

Management should also be aimed at finding solutions to facilitate the practice of sports by the population, at affordable costs or on a free basis.

An important action in healthcare prevention is to identify individual risk factors and replace them with systematic physical activities, for the formation of a lifestyle favorable to health. This also requires the introduction in

the 5th and 9th grade school curriculum of theoretical and practical notions referring to sports activities for health education, with the final aim of developing the necessary social and civic competences.

One of the main pillars of the national sport strategy elaborated by the MTS for the period 2014-2020 is the creation of a National Register for monitoring the biomotor potential of the school population. This register should be seen as a database on the health status of the entire population, starting with the school population. Biomotor potential data can be associated with data on periodic medical examinations performed by school doctors.

This material is based on editorials published in the Palestrica of the Third Millennium journal in the period 2013-2015, as well as on personal research (Bocu T. Cercetări în educaţie fizică şi sport. Actualităţi şi perspective. Ed. Casa Cărţii de Ştiinţă, 2008) and law projects regarding prevention in healthcare, 2016.

* * *

Tematica activităţilor fizice pentru prevenţia în sănătate a mai fost abordată în cadrul editorialelor revistei noastre, dar datorită importanţei şi actualităţii acesteia, revenim asupra ei.

Subiectul prevenţiei în sănătate are o importanţă majoră pentru populaţia României. În mod cert, costurile privind activităţile pentru prevenţia în sănătate aplicate oamenilor sănătoşi sunt mai mici decât costurile tratamentelor aplicate oamenilor bolnavi. Prevenţia în sănătate, adică misiunea promovării şi menţinerii sănătăţii, prin obiective declarate, şi-o asumă mai multe instituţii, atît de stat guvernamentale, cât şi private neguvernamentale, non profit. Instituţiile guvernamentale sunt următoarele: Ministerul Sănătăţii, Ministerul Educaţiei Naţionale şi Cercetării Ştiinţifice şi Ministerul Tineretului şi Sportului. Fiecare sector menţionat contribuie la prevenţia în sănătate cu infrastructura proprie, resursele umane specifice profilului său şi cu o parte a resurselor financiare. În vederea atingerii obiectivelor este necesară o colaborare intersectorială între instituţiile statului implicate în politica prevenţiei în sănătate. În afară de practicarea activităţilor fizice, prevenţia în sănătate este legată şi de activităţi privind alimentaţia şi nutriţia populaţiei, în strânsă corelaţie cu acestea. De aceea, la finanţarea activităţilor fizice de prevenţie în sănătate este necesar să contribuie şi Ministerul Agriculturii. De asemenea, pentru prevenţia în sănătate este necesară dezvoltarea unei infrastructuri diversificate, raportată la populaţia existentă. Deoarece acest demers se realizează pe baza unor proiecte pe termen mediu şi lung, un rol important îl are Ministerul Dezvoltării Regionale şi Administraţiei Publice. Pentru susţinerea financiară a activităţilor sportive de prevenţie în sănătate, se poate apela şi la bugetele locale sau la sponsorizări.

Dacă extrapolăm activităţile fizice din cadrul activităţilor generale pentru prevenţia în sănătate, observăm că acestea se regăsesc în misiunile primelor trei entităţi enumerate: activităţile fizice practicate regulat sunt recomandate populaţiei de către medicii epidemiologi şi de familie în cadrul profilaxiei primordiale şi primare; practicarea educaţiei fizice şi sportului şi activităţilor sportive extraşcolare se regăseşte în curricula şcolară şi universitară; iar practicarea activităţilor fizice care vizează în special populaţia ieşită din sistemul de educaţie se regăseşte în programele sportului pentru toţi.

Dezvoltarea infrastructurii necesare practicării activităţilor fizice de către întreaga populaţie, iar apoi managementul sau organizarea la nivel central şi local al acestor activităţi pe infrastructura existentă, sunt două dintre variabilele care trebuie avute în vedere de către factorii de decizie în privinţa prevenţiei în sănătate.

Infrastructura trebuie să asigure posibilitatea practicării diversificate a activităţilor fizice, conform opţiunilor cetăţenilor. Indicatorii urbanistici orientativi după care se calculează necesarul suprafeţelor sunt cei folosiţi în arhitectură şi construcţii, raportaţi la numărul populaţiei şi care prevăd un minim de 5 mp/locuitor, pentru amenajări de baze sportive în mediul urban. Infrastructura necesară poate fi asigurată prin lansarea de programe strategice naţionale sau regionale pe termen mediu şi lung, sustenabile financiar în formula de cofinanţare.

De exemplu, la o primă vedere se observă fără efort faptul că există un deficit de infrastructură la categoria piscine acoperite de dimensiuni mijlocii (25 m), şcolare şi publice, construite pe grupuri de şcoli, cartiere, sectoare. În urma unor studii efectuate s-a constatat că la nivelul municipiului Cluj-Napoca, acest deficit se ridică la aproximativ 16 piscine de dimensiuni publice, având o incintă de 600 mp. La nivelul judeţului Cluj, deficitul se poate calcula pornind de la necesarul de 46 piscine publice, repartizate în principalele 5 oraşe din judeţ şi principalele comune. Menţionăm că este vorba de un calcul ideal care prevede o cotă de 0,04 mp de piscină acoperită pentru fiecare cetăţean (din cei 5 mp care revin unui locuitor). Construirea acestor piscine poate face obiectul unui proiect strategic pe termen lung, susţinut anual în colaborare intersectorială, care să asigure necesarul de spaţii menţionat anterior, raportat la populaţia stabilă a judeţului, de 690.100 cetăţeni.

Managementul va trebui, de asemenea, orientat către găsirea unor soluţii de practicare a sportului de către populaţie, la costuri suportabile sau gratuit.

O activitate importantă în prevenţia sănătăţii este cea a identificării factorilor de risc individuali şi înlocuirea acestora cu activităţi fizice, practicate sistematic, în ideea formării unui stil de viaţă favorabil sănătăţii. Tot în acest sens este nevoie de introducerea în curricula şcolară a unor noţiuni teoretice şi practice, la nivelul claselor a 5-a şi a 9-a, referitoare la activităţile sportive de educaţie pentru sănătate, care să ducă în final la formarea competenţelor sociale şi civice necesare.

Printre pilonii de bază ai strategiei naţionale în domeniul sportului elaborată de MTS pentru perioada 2014-2020 figurează înfiinţarea unui Registru naţional de monitorizare a potenţialului biomotric al populaţiei şcolare. Acest registru trebuie văzut ca o bază de date asupra stării de sănătate a întregii populaţii, începând cu populaţia şcolară. Datele potenţialului biomotric se pot cupla cu cele ale examenelor medicale de bilanţ efectuate de către medicii şcolari.

Materialul se bazează pe editorialele publicate în revista Palestrica Mileniului III în perioada 2013-2015, precum şi pe unele cercetări personale (Bocu T. Cercetări în educaţie fizică şi sport. Actualităţi şi perspective. Ed. Casa Cărţii de ştiinţă, 2008), Proiecte de lege privind prevenţia în sănătate 2016.

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ORIGINAL STUDIES
ARTICOLE ORIGINALE

The use of internet and its relationship with the involvement in physical activity among Romanian school children from urban and rural areas

Utilizarea internetului și relația sa cu implicarea în activități fizice în rândul elevilor români din mediul urban și rural

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Abstract

Background. Adolescents use internet to get confidential and convenient access to an unprecedented level of information regarding a diverse range of subjects, to play games, to perform homework, to send messages and to network with other peers.

Aims. This article seeks to explore internet use related behaviours among Romanian adolescents, giving special attention to the possible differences between urban and rural areas. Moreover, the relationship between the time dedicated to internet use daily and the time dedicated to physical activity among adolescents will also be investigated.

Methods. A cross-sectional study was conducted in May 2014 in two schools in Cluj-Napoca and one school in Cuzdrioara among 187 adolescents aged 11-15. Information was collected by means of anonymous questionnaires.

Results. A percentage of 92% of subjects declared that they used internet for several purposes (information searching, email, social media, playing games). It was observed that statistically significantly more adolescents from rural areas declared that they did not use internet compared to adolescents from urban areas (15.9% vs 4%). Around half of the subjects used internet less than 1 hour/day and around one quarter declared the use of internet between 1-2 hours per day. More than 80% of the subjects had used internet in the last month for getting information for a school activity or homework, half were interested in searching information about socio-cultural events, while one third were interested in information regarding a healthy lifestyle (nutrition, physical activity, body weight, smoking prevention). Only one quarter of the participants followed the recommendations of performing at least one hour of moderate to intense physical activity daily. The results of the bivariate correlation show that there was no statistical association between the time spent using internet/day and the time spent for physical activity daily.

Conclusions. School instruction and health promotion programmes in Romania might take advantage of the spread of internet for developing sustainable, attractive and effective educational activities for adolescents.

Keywords: internet use, physical activity, Romanian adolescents.

Rezumat

Premize. Adolescenții utilizează internetul pentru a avea acces în mod rapid și confidențial la un nivel fără precedent de informații din diferite domenii, pentru a juca jocuri, pentru a-și face temele, pentru a comunica cu alte persoane.

Obiective. Acest articol încercă să exploreze comportamentele adolescenților din România cu privire la utilizarea internetului, acordând atenție diferențelor care ar putea să existe între mediul urban și rural. De asemenea, investighează relația dintre timpul dedicat activităților pe internet și timpul dedicat activităților fizice.

Metode. S-a realizat un studiu transversal în mai 2014 în 2 școli din Cluj-Napoca și o școală din Cuzdrioara, în rândul a 187 de elevi, cu vârsta cuprinsă între 11-15 ani. Datele au fost colectate prin intermediul unor chestionare anonime.

Rezultate. Un procent de 92% dintre subiecți utilizează internetul cu diferite scopuri (căutare de informații, e-mail, rețele de socializare, jocuri), observându-se că în mod semnificativ statistic mai mulți elevi din mediul rural declară că nu folosesc internetul în comparație cu cei din mediul urban (15.9% vs 4%). Aproximativ jumătate dintre adolescenți folosesc internetul mai puțin de o oră pe zi și aproximativ un sfert au declarat folosirea internetului 1-2 ore pe zi. Mai mult de 80% dintre subiecți au folosit internetul în ultima lună pentru a obține informații pentru activitățile școlare sau temele pentru acasă, jumătate au fost interesați să caute informații privind diferite evenimente socio-culturale, în timp ce o treime au fost interesați de informații

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privind un stil de viață sănătos (nutriție, activitate fizică, managementul greutății corporale, prevenirea fumatului). Doar un sfert dintre participanți respectă recomandările de a realiza zilnic cel puțin o oră de activitatăți fizice intense sau moderate. Rezultatele analizei de corelație bivariată arată faptul nu au fost asociații semnificative statistic între timpul petrecut pe internet și timpul dedicat activităților fizice.

Concluzii. Programele de instruire școlară și de promovare a sănătății din România ar putea beneficia de răspândirea utilizării internetului pentru a realiza activități educaționale sustenabile, atractive și eficiente pentru adolescenți.

Cuvinte cheie: utilizarea internetului, activitate fizică, adolescenți români.

Introduction

Adolescents use internet to get confidential and convenient access to an unprecedented level of information about a diverse range of subjects, to play games, to perform homework, to send messages and to network with other peers (Graya et al., 2005; Tahiroglu et al., 2008). The use of internet on computers, tablets, mobile phones is increasing very much in several countries of Europe; this approach is very popular especially among young groups (***, 2014).

The use of internet has several advantages related to healthy lifestyle promotion, such as providing specific content related to healthy nutrition and physical activity, offering interactive possibilities for information and education, rapid feedback and even personalised counselling by use of computer tailored educational programs, facilitation of recruitment and follow-up of participants in several educational programs, providing supportive social influences for the adoption of healthy lifestyle behaviours, high potential of reaching large groups of people who have internet access (Chou et al., 2013; Li et al., 2013; Lotrean et al., 2009; Lotrean et al., 2015; Lustria et al., 2013).

Nevertheless, several potential threats are also present, such as the quality of information which might be accessed, exposure to advertisement for alcohol and tobacco products, exposure to online violent behaviour and pornography, risk of exposure to cyberbullying (Tahiroglu et al., 2008; Dowel et al., 2009). Moreover, there are concerns that internet abuse might lead to addictive behaviour and can also have detrimental effects on the involvement in physical activity and well-being of adolescents (Li et al., 2013; Brindova et al., 2015).

The World Health Organization emphasises the importance of performing at least 60 minutes of moderate to vigorous physical activity by adolescents daily, because of its positive physical and psychological effects (Currie et al., 2012). Despite this, studies from different countries underline that many adolescents do not follow this recommendation, using means of transport and organizing their free time in a sedentary manner (Currie et al., 2012; Li et al., 2013; Lotrean et al., 2008). Several studies show that excessive TV watching as well as screen based activities (working on computers or playing on computers) decrease the involvement of adolescents in physical activity and interfere with sleep duration (***, 2001; Brindova et al., 2015). Recently, different studies have assessed the effects of new information and communication technologies (internet, social media, use of mobile applications, mobile phone texting) on physical activity, but the results are mixed. Some studies show that they decrease the number of hours of physical activity, while others did not find this or even presented results which showed that the use of these technologies increased the involvement in physical activity (Spengler et al., 2015; Takács, 2013; Lepp et al., 2013; Zhang et al., 2015) .

Hypothesis

This article seeks to explore internet use related behaviours among Romanian adolescents, giving special attention to the possible differences between urban and rural areas. Moreover, the relationship between the time dedicated to internet use daily and the time dedicated to physical activity among adolescents will also be investigated.

Material and methods

Research protocol

a) Period and place of the research

A cross-sectional study was conducted in May 2014 in two schools in Cluj-Napoca and one school in Cuzdrioara - a rural area of Cluj county. Ethical approval for the study was obtained from the directorate of each school; in Romania, school principals are entitled to decide whether or not their students may participate in health related surveys and educational programs.

b) Subjects and groups

The study involved school children from the fifth to eighth grade aged 11-15 years. In each school, one class per grade level was randomly selected and all pupils who were present in the selected classes on the day of the survey were included in the study.

c) Tests applied

The study used an anonymous questionnaire, which was filled in by the adolescents. The questionnaire was based on literature data (Lotrean et al., 2010; Lotrean et al., 2014; Bauman et al., 2009) and included 100 items related to demographics, as well as a wide range of health related behaviours: alimentary habits, involvement in physical activity, weight management, smoking and alcohol use, internet use related behaviour (name of the questionnaire: Assessment of the lifestyle of school children, author: Lotrean LM).

All study subjects were asked to fill in an anonymous questionnaire, which took approximately 50 minutes. All participants read an introductory letter, which assured them that the study procedures were designed to protect student anonymity and allow for voluntary participation.

The questionnaire was administered and collected in the classroom by members of the research team. Teachers were present in the classroom during data collection, but they stood in front of the class and did not take part in the collection of questionnaires. No refusals were recorded; non-response was exclusively due to absence during the

day of assessment.

The information included in this study focused on the use of internet and involvement in physical activity. The use of internet was assessed by asking the adolescents how many days they used it during one week, how many hours a day they used it, if they had an email address and social media account, as well as if they had used internet in the last month for searching information for school, about different socio-cultural events or a healthy lifestyle (nutrition, physical activity, weight management, smoking prevention).

The study also assessed the involvement of adolescents in intense physical activity (number of days/week, number of minutes/day), as well as in moderate physical activity (number of days/week, number of minutes/day) and walking (number of days/week, number of minutes/day).

d) Statistical processing

The prevalence of the investigated behaviour was assessed and chi^2 tests were used in order to assess the differences between participants from urban and rural areas with respect to several items.

The daily time spent on internet was calculated by multiplying the number of days/week dedicated to this activity by the number of hours/day, divided by 7.

The time spent for physical activity was the sum of time allocated to intensive and moderate physical activity (including walking) declared by students; the time dedicated to physical activity of each level of intensity was calculated by multiplying the number of days per week spent for physical activity of that level of intensity by the number of minutes per day, divided by 7.

Bivariate correlation was used in order to estimate the association of the daily time spent on internet with the time dedicated to physical activity per day.

Data analysis was performed with the SPSS-20.0 statistics program. Significant results were reported at $p < 0.05$.

Results

The study sample included 187 adolescents - 124 from Cluj-Napoca (48.4% boys and 51.6% girls) and 63 from Cuzdrioara (60.3% girls and 39.7% boys).

Table I shows that almost all of the subjects declared that they used internet for several purposes (information searching, email, social media, playing games). It was observed that statistically significantly more adolescents from the rural area declared that they did not use internet compared to adolescents from the urban area (15.9% vs 4%). Around half of the study sample used internet less than 1 hour/day and around one quarter declared the use of internet between 1-2 hours per day, the last situation being more frequent among adolescents from the urban area; one out of five adolescents used internet more than two hours per day. Moreover, 87% of the adolescents had an email address, with adolescents from the urban area declaring this more frequently than those from the rural area, while 83% of the subjects had a social media account, with no differences between urban-rural areas.

With respect to the interest of adolescents in searching information on the internet, the study showed that more than 80% had used internet in the last month for getting information for a school activity or homework, half were interested in searching information about socio-cultural events, while one third were interested in information regarding a healthy lifestyle (nutrition, physical activity, body weight, smoking prevention). Adolescents from the urban area were more interested in getting information about socio-cultural events than those from the rural area.

On the other hand, only one quarter of the participants followed the recommendation to perform at least one hour of moderate to intense physical activity daily, without urban-rural differences being observed. Moreover, around half of the students from the urban area and 61% of those from the rural area performed less than half an hour of physical activity daily.

Table I
Internet use and involvement in physical activity

Items	Subjects		
	Urban N=124 %	Rural N=63 %	Total N=187 %
Internet use			
Never	4*	15.9	8
Less than 1 hour/day	44.3	44.4	44.3
1-1.9 hours/day	32.3*	15.9	26.7
2-3 hours/day	7.3	14.3	9.6
More than 3 hours/day	12.1	9.5	11.4
Searching internet for lifestyle related information in the last month	35.8	31.7	34.2
Searching internet for school related information in the last month	81.4	82.5	81.8
Searching for socio-cultural events related information in the last month	54.8*	39.7	49.7
Having an email account	92.7*	76.2	87.1
Having a social media account	83.8	82.5	83.4
Physical activity			
Less than 30 minutes/day	50*	61.9	54
30-59 minutes/day	23.5	14.3	20.3
1-2 hours/day	21.7	15.9	19.8
More than two hours/day	4.8	7.9	5.9

* - statistically significant differences in the chi^2 test between subjects from urban and rural areas

The results of bivariate correlations show no statistical association between the time spent using internet/day and the time spent for physical activity daily.

Discussion

The use of different forms of information and communication technologies is a reality faced by youth all over the world (***, 2014; Graya et al., 2005).

Our study reveals a high internet access and use among adolescents in Cluj-Napoca, a large Romanian city, as well as among those in Cuzdrioara - a rural area of Cluj county situated at 60 km from Cluj-Napoca. Several studies have shown that access to the internet in Romanian rural areas is far behind its use in urban areas (1). Our study also found significant differences with regard to internet access and use between adolescents from a big city and adolescents from a rural area, but, nevertheless, more than 80% of students from the rural area where the study was performed used internet for several purposes. Future studies should investigate the use of internet, as well as stimulating and

deterring factors in several regions of Romania, both in large and small urban and rural areas.

More than 80% of the study subjects searched information on the internet for their school activity and homework, showing the potential of including internet based activities as instruments for stimulating active learning, problem-based teaching methods, group and individual projects, skills development, distance learning. Further investigation is needed in order to find opportunities and ways to increasingly incorporate this approach into the Romanian school system, based on feedback from teachers, pupils and parents.

Half of the adolescents relied on the internet for finding information about socio-cultural events, while one third of them declared having searched information related to lifestyle (nutrition, physical activity, weight management, smoking prevention) in the last month. This underlines the importance of incorporating the information and communication technologies into the development of health promotion programs. Studies from other countries show examples of several programs which used the internet and computer tailored programs for educating and motivating adolescents and young people to adopt a healthy nutrition, an active lifestyle and obesity prevention (Chou et al., 2013; Li et al., 2013; Lustria et al., 2013; Bennet & Glasgow, 2009; Kreps & Neuhauser, 2010; Kroeze et al., 2006). Future research should focus on the development, implementation and evaluation of health promotion programs for Romanian adolescents using innovative approaches, including the use of internet, to create communication networks and personalised educational programs which are attractive, sustainable and effective in motivating and supporting adolescents to adopt a healthy lifestyle.

On the other hand, the study shows that only one quarter of adolescents complied with the recommendation to perform at least one hour of moderate to intense physical activity. Other Romanian and European studies also underline the low involvement of adolescents in physical activity, which calls for long-term strategies to combat this public health problem (Lotrean et al., 2008; Currie et al., 2012). Our study data show that the time spent on internet did not influence the daily time dedicated to physical activity.

Actually, the time spent using internet every day was less than 2 hours for around 80% of the participants. The data of our study show that many adolescents had an email account and a social media account. The use of social media could pose several threats, which might be reduced by a good communication between parents and children with regard to what teens are doing with social media. On the other hand, there are also recent studies that have started to focus on the potential of social media to motivate, provide social support and guidance for stimulating involvement in physical activity, but the results are mixed, with some studies finding evidence for this, and others not (Lefebvre & Bornkessel, 2013; Laranjo et al., 2015; Korda et al., 2013; Maher et al., 2014).

The limitations of the study include its limited sample and cross-sectional design, as well as the fact that the study did not assess internet safety issues.

Conclusions

1. Around 92% of adolescents used internet, for purposes such as searching information for school, about socio-cultural events, and lifestyle related information.

2. Only one quarter of the adolescents complied with the recommendation to perform at least one hour of moderate to intense physical activity daily.

3. The time spent on internet daily did not decrease the involvement in physical activity among our study sample.

4. School instruction and health promotion programmes in Romania might take advantage of the spread of internet in both urban and rural areas for developing sustainable, attractive and effective educational activities for adolescents.

Conflicts of interests

The authors have no conflict of interest.

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Consumers' knowledge, interest and attitude toward functional food in a Romanian population sample

Cunoștințele, interesul și atitudinea consumatorilor în privința alimentelor funcționale pe un eșantion din România

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Abstract

Background. The definition of "functional food" encompasses a wide variety of food containing biologically active components believed to reduce the risk of specific disease and promote overall health and well-being, but nowadays the term is widely used in food marketing and mistaken by consumers.

Aims. The goal of the present study was to evaluate the knowledge, interest and attitude on functional food among Romanian consumers. Also, we aimed to investigate if income level or education level affect knowledge and interest regarding functional foods.

Methods. Data were collected from an online questionnaire using Google Docs in Romania (n=265). The majority of the consumers who submitted the questionnaire were women (n=249), aged 20 to 24 (n=122) and reported higher education (n=229).

Results. Our study showed that high income consumers are more interested in functional foods even if they are not better informed in comparison with low income consumers. Also, the level of education does not influence the knowledge regarding functional foods. Furthermore, 243 out of 265 recognize functional foods as whole foods but confuse them with dietary supplements, medicine herbs or fortified food.

Conclusions. Based on our study, we can conclude that the interest in functional foods is influenced by income level and the knowledge about them is not linked with the level of education. Also, we have confirmed that there is much confusion among Romanian consumers regarding functional foods; therefore there is a need for further campaigns in order to educate and inform consumers.

Keywords: functional food, consumers, knowledge, attitude, interest.

Rezumat

Premize. Definiţia alimentelor funcţionale înglobează o varietate mare de alimente bogate în compuşi biologic activi, care se consideră că reduc riscul anumitor patologii şi îmbunătăţesc starea generală de sănătate. Actualmente acest termen este folosit frecvent în marketingul alimentar şi confundat de către consumatori.

Obiective. Studiul de faţă a avut ca obiectiv evaluarea cunoştinţelor, interesului şi a atitudinilor referitoare la alimentele funcţionale în rândul consumatorilor români. Un alt obiectiv a fost investigarea legăturii dintre nivelul educaţiei sau al venitului, în raport cu interesul şi cunoştinţele consumatorilor în ceea ce privesc alimentele funcţionale.

Metode. Datele au fost colectate prin intermediul unui chestionar utilizând Google Docs (n=265). Majoritatea consumatorilor care au completat chestionarul au fost de sex feminin (n=249), cu vârste cuprinse în 20-24 ani (n=122), cu studii superioare.

Rezultate. Studiul de faţă a aratat faptul că interesul faţă de alimentele funcţionale este mai crescut în rândul consumatorilor cu venituri mari, cu toate că această categorie de consumatori nu posedă cunoştinţe mai mari despre alimentele funcţionale, comparativ cu cei cu venituri mai mici. În plus, 243 din 265 respondenţi recunosc alimentele funcţionale, dar le confundă cu suplimentele alimentare, ierburile medicinale sau alimentele fortifiate.

Concluzii. Pe baza cercetării noastre, putem concluziona faptul că interesul consumatorilor vis-a vis de alimentele funcţionale este influenţat de venit, iar cunoştinţele despre alimentele funcţionale nu depind de nivelul de educaţie. Studiul de faţă a confirmat faptul că există confuzie în ceea ce priveşte alimentele funcţionale, inclusiv in rândul consumatorilor din ţara noastră, astfel că este nevoie de campanii de educare şi informare în rândul acestora..

Cuvinte cheie: alimente funcţionale, consumatori, atitudini, interes, cunoştinţe.

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Introduction

The term *functional food* is widely used as a marketing term, but there is no globally recognized definition. Even though all food is essentially functional as it has nutritional value, a food can be considered functional only if it provides an additional health benefit. It is not clearly defined which foods are considered functional. The Academy of Nutrition and Dietetics defines functional foods as follows: "Foods defined as whole foods along with fortified, enriched, or enhanced foods that have a potentially beneficial effect on health when consumed as part of a varied diet on a regular basis at effective levels". The European Commission defines functional foods as "A food that beneficially affects one or more target functions in the body, beyond adequate nutritional effects, in a way that is relevant to either an improved state of health and well-being and/or reduction of risk of disease, It is part of a normal food pattern. It is not a pill, a capsule or any form of dietary supplement" (Krowe & Francis, 2013).

Japan was the first country to promote functional food and introduced a health-related food category named FOSHU (Food for Specified Health Uses) (Menrad, 2003). Consumer interest in functional foods and their health benefits has increased lately (Mollet & Rowland, 2002). In the last decades, lifestyle changes have led to a higher incidence of cardiovascular disease, hypertension and diabetes. More and more people believe that foods can contribute to their health, by improving their well-being and preventing certain diseases. A balanced diet is essential for optimal growth and development (Pang et al., 2012).

The attitude towards functional food depends on the consumers' knowledge of the health benefits provided (Siro et al., 2008). Results of surveys in European countries show consumers are often confused with regards to the term "functional foods" (Menrad, 2003).

The acceptance and consumption of functional foods determine market success. Sales of functional foods and beverages reached over $118 billion in the US in 2012, followed by Japan, England and Germany (Sloan, 2014). Functional foods are popular in Netherlands, England, France, Germany (Sparke & Menrad, 2009) and Switzerland (Siegrost, 2008). There is a high demand for functional foods in these countries, especially among the higher income population (Siro et al., 2008).

Objectives

The main goal of the present study was to evaluate the knowledge of, interest in and attitude towards functional foods among Romanian consumers. Data about consumers' knowledge, interest and attitude toward functional food is lacking in our country. As far as we know, little research has evaluated the knowledge of, interest in and attitude toward functional food among Romanian consumers.

Hypothesis

We hypothesized that knowledge of functional foods depends on the income and education level. Also, this study will investigate whether there is a link between income and the interest in functional foods.

Material and methods

Reasearch protocol

According to the Helsinki Declaration, the Amsterdam Protocol and Directive 86/609/EEC, we obtained the approval of the Ethics Commission of the "Iuliu Haţieganu" University of Medicine and Pharmacy Cluj-Napoca for this study.

a) Period and place of the research

The study was conducted in Romania during May - September 2014 and was distributed on social networking sites.

b) Subjects and groups

Two hundred and sixty-five people completed the questionnaire (n=265). Ninety-four percent (n=249) of the respondents were females and six percent (n=16) were males. Participants who were younger than 19 years old were excluded from the present study (n=8). Before completing the survey, all the participants received written information about the study goal and design and gave their informed consent regarding the data use. Participants received no previous information regarding functional foods. The sample characteristics of the consumers participating in the study are presented in Table I.

Table I

Sample characteristics.

Sample characteristics	Total	%
n	265	
Gender		
Male	16	6
Female	249	94
Age (years)		
20-24	122	46
25-30	84	31.6
31-40	48	18.1
41-50	9	3.3
> 50	2	0.7
Education		
Higher education	229	86.4
High school	29	10.9
Secondary education	7	2.6
Other education	–	–

c) Tests applied

Data were collected based on an anonymous, self-administered online questionnaire using Google Docs. The consumers filled in a 10 multiple choice or one choice questionnaire designed by the research team. The questionnaire collected data regarding the participants' age, sex, and education. Questions regarding the monthly income and the average amount of money spent on food every month were also asked. Participants were asked about functional foods, food choices when doing their grocery shopping, interest in reading food labels when shopping, in order to assess their knowledge, interest and attitude towards functional foods, as follows:

- What is the definition of functional foods?
- Which of the following foods do you believe is functional?
- What are the benefits of functional foods?
- Which of the following foods do you choose when doing grocery shopping?
- Do you read food labels while doing your grocery shopping?
- How much money do you spend on food every month?

d) Statistical processing

Data were collected in a Microsoft Office Excel work-

sheet. Data were analyzed using Microsoft Excel and EpiInfo. For data analysis, we considered high income a monthly income higher than 451.72 EUR, which was higher than the average monthly income in 2014 in Romania (1).

Higher education and high income were the independent variables, and knowledge of, interest in and attitude toward functional food were the dependent variables. The Chi square test (p) was used to calculate whether there was a link between an independent variable and a dependent variable. Differences were considered statistically significant when $p < 0.05$.

Results

The financial profile regarding monthly income and the amount of money spent on food each month are presented in Table II.

Table II
Financial profile.

Financial profile	Total	%
n	265	
Monthly income (EUR)		
Financially supported	74	27.9
< 225.8	33	12.4
225.8 - 338.5	48	18.1
338.5 - 451.7	28	10.5
> 451.7	82	30.9
Amount of money spent on food every month? (EUR)		
< 47.1	28	10.5
45.1 - 112.9	126	47.5
112.9 - 225.8	76	28.6
> 225.8	35	13.2

The distribution of the consumers' responses to the questionnaire is presented in Table III.

Table III
Questions regarding the knowledge, interest and attitude toward functional food among Romanian consumers.

Sample characteristics	Total
Do you read food labels while doing your grocery shopping?	
Never	1
I am not interested	0
Just for some products	83
Sometimes	88
Always	93
While doing your grocery shopping you choose	
Food with less ingredients	87
Diet food (Coca-Cola Zero, Non-fat dairy)	34
Food without artificial ingredients	101
Organic/bio food	79
Food from the fresh food market	207
Functional foods include	
Whole food that provides health benefits	243
Dietary supplements	19
Diet food	15
Medicine herbs	35
Fortified/enriched food	44
Functional foods can	
Reduce the risk of developing a certain disease	140
Prevent disease	115
Cure	23
Improve health	202
Which of these foods can be considered as functional?	
Whole grain cereals	209
Berries	194
Fermented food	72
UHT milk	28
Palm oil	50
Margarine with omega 3	18
Soy	85

The interest in functional food was assessed by the willingness to read food labels when shopping. Results regarding the link between income and the interest in functional food have statistical significance ($p<0.05$) and are presented in Figure 1.

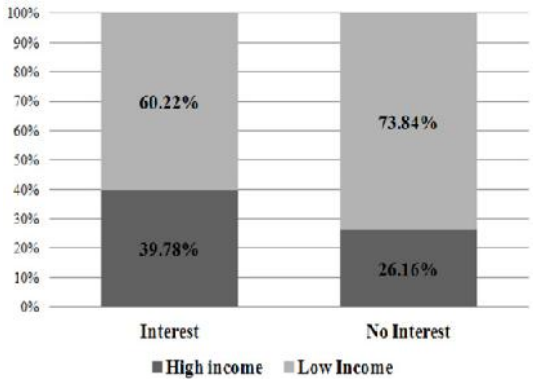

Fig. 1 – The link between income and interest in buying functional foods.

The relationships between the income level and knowledge regarding functional food, as well as between the education level and knowledge are presented in Figure 2 and Figure 3, respectively. There is no statistical significance between the level of education and knowledge of functional ($p>0.05$) foods, but income seems to have a tendency to be statistically significant in relation to knowledge ($p=0.05$).

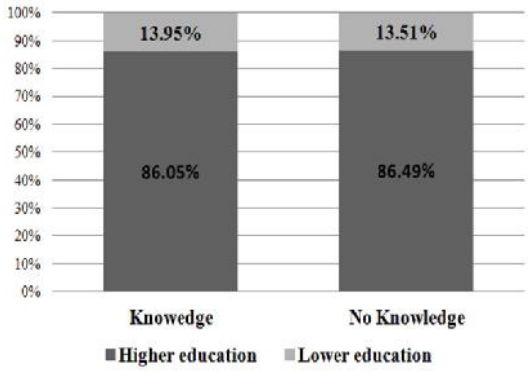

Fig. 2 – The link between education level and knowledge about functional foods.

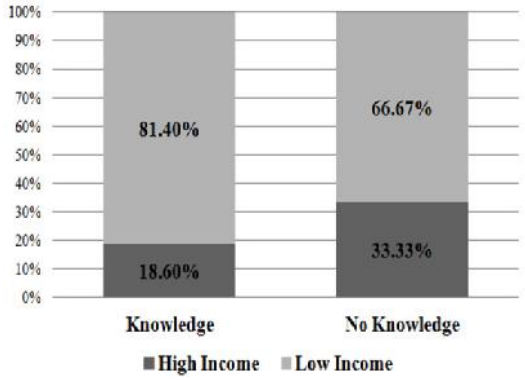

Fig. 3 – The link between income and knowledge about functional food.

Discussions

Our study evidenced a statistically significant relationship between the interest in functional foods, as shown by the willingness to read food labels when shopping, and the high income of consumers ($p<0.05$). It seems that high income consumers are more interested in functional foods, as presented in Figure 1, even if they do not know more about the subject compared to low income consumers, as shown in Figure 3. One reason for this result could be that people in Romania have a lower average wage compared to most Western European countries. Our results are similar to those of Popa and Niculiță, who concluded that young professional Romanian women look for healthy foods in terms of low fat content and rich nutritional values (Popa & Niculiță, 2013). Our study replicated some of the findings produced by Sloan (2014), who found that 6 out of 10 participants read the food labels while shopping, whereas our study found that 181 out of 265 participants always read the food labels while shopping, as presented in Table III. Furthermore, willingness to read food labels may also be influenced by ethnicity (Gorton, 2009).

Our study suggests that the level of education does not influence the consumers' knowledge of functional foods, as shown in Figure 2. These findings are similar to those of Chambers and Lobb, in a study conducted among British consumers (Siro et al., 2008). Contrary to our findings, Stewart-Knox (2007) found that higher educated consumers are more willing to buy functional food than less educated consumers.

Results from our questionnaire revealed that 243 out of 265 participants believe that functional foods are whole food that provides health benefits. A similar study conducted among Belgian consumers found that 49% of consumers recognized functional food (Krygier, 2007). As presented in Table III, 113 out of 265 respondents confuse functional foods with dietary supplements, diet food, medicine herbs and fortified food. One reason for this result could be that there is little information about functional foods among Romanian consumers. A study conducted among Hungarian consumers revealed that 70% of the participants were not familiar with functional foods (Szakaly et al., 2004).

Furthermore, we found that 140 out of 265 respondents believe that functional foods can reduce the risk of developing a certain disease and 115 out of 265 believe that functional foods can prevent disease, as presented in Table III. Our findings were similar to those of a study conducted among American consumers, showing that 8 out of 10 consumers believe functional foods can prevent or delay cardiovascular disease, osteoporosis or type 2 diabetes (Sloan, 2014). Results also show that 207 out of 265 consumers prefer buying food from the fresh market while doing their grocery shopping. Another study found that consumers from Mediterranean countries prefer natural, fresh foods and consider them a better choice (Menrad, 2003). Furthermore, a Romanian study among young professional women underlined the willingness to buy fresh food from open markets with "made in Romania" products in order to eat healthy and encourage the local economy (Popa & Niculiță, 2013).

As Table I and Table II show, most of the participants were female, well educated, having a higher income. This finding suggests that well educated, higher income women are more reflective about health issues and eating choices than men. Previous research has suggested that female consumers have a stronger interest in functional foods as they are responsible for grocery shopping (Bech-Larsen & Scholderer, 2007). The target population interested in functional foods in the present study was represented by young women, whereas in a study conducted by Lynam et al. (2011) among Scottish consumers, senior women were more interested in foods that provide health benefits.

The results of the present study may be of real inte-rest for health professionals, as they play an important role in educating the population, raising knowledge and interest in functional foods and making consumers more aware of their food choices. Food manufacturers and the pharmaceutical industry may benefit from the development of functional foods by informing consumers about the potential benefits of such products. Our findings could also serve for future marketing strategies for the Romanian functional food market.

Some limitations of the present study should be addressed. The sample is not representative of the Romanian population, as most of the participants in the present study were young, well educated women. In future research, we might sample for diversity as in heterogeneity sampling. Finally, there are obvious limitations inherent to the instrument used to collect information (i.e., the self-administered questionnaire).

Conclusions

1. The interest in buying functional foods is influenced by income.
2. Knowledge about functional food is not influenced by the level of education, but might be influenced by the income level.
3. The majority of respondents recognize functional food as whole food that provides health benefits, but they confuse the term with dietary supplements, medicinal herbs or fortified food. This strongly suggests the need for education and information campaigns among Romanian consumers.

Conflicts of interests

There are no conflicts of interest.

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The influence of physical activity on pregnancy evolution and the newborn's weight

Influența activității fizice asupra evoluției sarcinii și greutății nou-născutului

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Abstract

Backround. The indications regarding the level of physical activity during pregnancy comply with the recommendations for healthy individuals to complete a minimum of 30 minutes/day physical activity to ensure an optimal health condition.

Aims. The purpose of this paper is to demonstrate the benefits of physical activity sustained by pregnant women on the pregnancy evolution and anthropometric data of the mother and the newborn.

Methods. The research is based on an analytical observational study, conducted on a sample of 85 pregnant women from Mureș county, Romania. The study was performed between October 2015 - January 2016 and the data were collected based on an interview with 20 open questions.

Results. We identified a significant association between a sedentary lifestyle and weight gain outside the recommendations during pregnancy ($p<0.0001$). Sustained physical activity during pregnancy represented a protective factor against inadequate weight in newborns ($p=0.001$). Physical inactivity was not a risk factor for birth through cesarean section ($p=0.637$), gestational age classification outside the standards ($p=0.155$), or the occurrence of difficulties in breastfeeding ($p=0.296$).

Conclusions. Lack of physical activity during pregnancy is a risk factor resulting in inadequate anthropometric data in both the mother and newborn. Sustained physical activity among pregnant women is not a negative factor in the development of pregnancy.

Keywords: physical activity, pregnancy, weight gain, newborn, breastfeeding

Rezumat

Premize. Indicațiile privind nivelul de activitate fizică în timpul sarcinii respectă recomandările pentru indivizii sănătoși, și anume, de un minim de 30 de minute/zi pentru asigurarea stării optime de sănătate.

Obiective. Scopul lucrării este de a demonstra beneficiile activității fizice în cazul femeilor însărcinate asupra evoluției sarcinii, asupra datelor antropometrice ale mamei, respectiv ale nou-născutului.

Metode. Cercetarea se bazează pe un studiu de tip analitic observațional realizat pe un eșantion de 85 de femei însărcinate cu domiciliul în județul Mureș, România. Perioada de desfășurare a studiului a fost octombrie 2015-ianuarie 2016, iar datele au fost preluate pe baza unui interviu cu 20 de întrebări deschise.

Rezultate. S-au observat asocieri semnificative între sedentarism și greutatea crescută peste recomandări în timpul sarcinii ($p<0.0001$), activitatea fizică susținută în timpul sarcinii fiind un factor protector împotriva greutății nepotrivite la nou-născut ($p=0.001$). Sedentarismul nu a reprezentat un factor de risc pentru nașterea prin operație cezariană ($p=0.637$), încadrarea vârstei gestaționale în afara standardelor ($p=0.155$) sau apariția dificultăților la alăptare ($p=0.296$).

Concluzii. Lipsa activității fizice în timpul sarcinii reprezintă un factor de risc în apariția datelor antropometrice necorespunzătoare la mamă și la nou născut. Activitatea fizică susținută în rândul femeilor însărcinate nu este un factor negativ în evoluția sarcinii.

Cuvinte cheie: activitate fizică, sarcină, creștere în greutate, nou-născut, alăptare.

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Introduction

The benefits of physical activity to health are huge and are felt in the long and short term. In the case of pregnant women, recommendations are to perform 30 minutes/day physical activity (PA), which is applicable to all healthy individuals in order to ensure optimal health (Thompson et al., 2015).

Physical exercise during pregnancy has significant benefits for maternal health and the development of pregnancy. Thus, a moderate-intensity effort can lead to a decrease in the severity of postnatal depression symptoms (Robledo-Colonia et al., 2012), an improvement in mood (Poudevigne & O'Connor, 2006), prevention of abnormal weight gain during pregnancy, and the possibility to reduce postpartum weight retention (Weissgerber et al., 2006). The influence of PA on the health of newborns is assessed by correlating the weight gained during pregnancy (which is influenced by PA), with the child's weight and length, the correlation being significant: an appropriate weight gained by the mother during pregnancy is related to a proper weight of the child (Bodnar et al., 2011; Hadmaş et al., 2015; Oken et al., 2009; Sen et al., 2010).

Hypothesis

The objective of the study was to monitor the rate of PA among pregnant women and to assess its benefits for pregnancy and maternal health, as well as the impact on the newborn's anthropometric data.

Materials and methods

Research protocol

Data collection and analysis was initiated after obtaining the written consent of the subjects to participate in the study. The data obtained were used to perform an analytical observational study.

a) Period and place of the research

The study was conducted between October 2015 - January 2016, in Mureș county, Romania.

b) Subjects and groups

In order to conduct the study, we analyzed a sample of 85 female subjects. The inclusion criteria in the study were: mothers who gave birth between July-August 2015, without diagnosed chronic diseases, aged between 18-40 years, having residence in Mureş county.

c) Test applied

Data were collected based on an interview with 20 open questions concerning: demographic data, personal data, anthropometric data before conception, weight gained during pregnancy, sustained physical activity levels during pregnancy, the newborn's health, and anthropometric data at birth.

Weight and length considered normal for the newborn were: 2500-4000 grams and 48-54 cm. Gestational age was considered appropriate in the range of 37-41 weeks (Stamatin & Păduraru, 2009; Aujard et al., 1997). To evaluate maternal body weight, calculation of BMI (body mass index) was used. The normal weight gained during pregnancy was established in relation to the BMI value. The weight gain considered adequate according to BMI value interpretation was: 13-18 kg for underweight, 11-16 kg for normal weight, 7-11 kg for overweight, and 5-9 kg for obese status (Hadmaş et al., 2015; Lammi Keefe et al., 2008; Whitney & Rolfes, 2009).

d) Statistical processing

Statistical tests were performed using GraphPad Prism 5.0. software. The evaluation tests used were: Fisher's exact test, Pearson correlation, standard deviation (SD), mean, minimum/maximum values.

Results

A percentage of 77.64% (n=66) of the subjects included in the study were from urban areas and 22.35% (n=19) were from rural areas. The mean age of the participants was 27.68 years, with a minimum of 18, and a maximum of 36 years. Classification by age was performed as follows: 3.52% (n=3) were aged under 20 years, 61.18% (n=52) were aged between 21-30 years, and 35.29% (n=30) were older than 30 years.

In order to characterize the education level of the mothers, four categories were considered: middle school, high school, university and post-university degrees. Thus, 14% of the subjects (n=12) had completed secondary school, 27.4% (n=21) had high school education, 49.4% (n=42) were college graduates, and 11.76% (n=10) had postgraduate studies. When analyzing the weight gained during pregnancy, we identified an average value of 16.45 kg, with a minimum of 7 kg, and a maximum of 30 kg. Depending on the gestational age of the subjects, these were classified as follows: 24.71% (n=21) had a premature birth, 74.11% (n=63) gave birth at term, and 1.17% (n=1) had a postmature birth. The mean gestational age was 37.87, with a minimum value of 27 and a maximum value of 43 weeks. From the point of view of the type of birth, 64.7% (n = 55) had a vaginal birth, and 35.29% (n = 30) had a cesarean section birth.

The level of physical activity was characterized as follows: 34.11% (n=29) completed a minimum of 30 minutes/day physical activity, while 66.88% (n=56) exercised less than 30 minutes/day, or not at all. Among the individuals who performed regular physical activity, the minimum value recorded was 30 minutes/day, and the maximum value was 120 minutes/day, with an average of 48.03 minutes/day, the activity being characterized as low/moderate intensity. Birth weight was normal in 71.76% of cases (n=61), low in 2.35% (n=2), and high in 25.88% of cases (n=22). The minimum weight recorded was 2450 grams, and maximum weight was 4600 grams, with an average value of 3520 grams.

In terms of breastfeeding, 80% (n=68) of the subjects did not encounter difficulties in feeding their newborn with breast milk, and 20% (n=17) had an insufficient amount of breast milk. A statistically significant correlation ($p=0.0002$) was established between PA and the weight gained during pregnancy. Sedentary pregnant women were predisposed to an abnormal increase in weight during pregnancy (OR = 6.50, 95% CI: 2.40-17.58); the risk of having a higher weight than recommended was significant ($p <0.0001$; OR = 29.290, 95% CI: 6.059 to 141.5).

In this group, no significant correlation between a sedentary lifestyle and gestational age outside the standards was obtained ($p = 0.296$; OR = 2.092, 95% CI: 0.683 to

Table I
The Fisher's exact test results in calculating sedentary lifestyle risk on certain factors.

Risk category	Sensitivity (95% CI)	Specificity (95% CI)	Predictive value	
			Positive (95% CI)	Negative (95% CI)
A	0.366 (0.199 to 0.561)	0.685 (0.544 to 0.804)	0.392 (0.215 to 0.594)	0.66 (0.521 to 0.781)
B	0.82 (0.685 to 0.914)	0.588 (0.407 to 0.753)	0.745 (0.61 to 0.853)	0.689 (0.491 to 0.847)
C	0.772 (0.546 to 0.912)	0.381 (0.261 to 0.512)	0.303 (0.187 to 0.441)	0.827 (0.642 to 0.941)
D	0.916 (0.730 to 0.989)	0.433 (0.305 to 0.567)	0.392 (0.265 to 0.532)	0.928 (0.765 to 0.991)
E	0.812 (0.543 to 0.959)	0.388 (0.271 to 0.515)	0.24 (0.134 to 0.376)	0.896 (0.726 to 0.978)

6.410). Insignificant data were also obtained in the case of reported sedentary lifestyle and breastfeeding difficulties (p=0.155; OR=2.748, 95% CI: 0.713 to 10.58).

No statistically significant risk was observed between physical inactivity and the risk of birth through cesarean section, OR = 1.26 (CI 95%: 0.492 to 3.222; p=0.637). Therefore, physical activity was not a protective factor against cesarean section in this group.

We determined a significant influence of low level physical activity on the child's weight status at birth (p=0.001), the newborn beeing predisposed to an inappropriate birth weight in relation to gestational age and length (OR = 8.412, CI95%: 1.812 to 39.05).

In Table I, we presented additional statistical data obtained after performing the Fisher's exact test, in order to associate the sedentary lifestyle with the risk of birth through cesarean section (A), the risk of abnormal weight gain during pregnancy (B), the risk of birth at a gestational age beyond normal limits (C), the risk of having a child with an inappropriate birth weight (D) and the risk of difficulties during the lactation period (E).

Table II presents the correlations between PA during pregnancy and the mother's education level, age, and environment of origin.

Table II
PA correlation with maternal data.

Indicator	r	95% CI	p value
Level of education	0.245	0.034 to 0.436	0.02
Maternal age	0.078	-0.137 to 0.286	0.477
Environment of origin	-0.186	-0.382 to 0.030	0.092

Discussions

The most statistically significant association in the studied group was the correlation between a sedentary lifestyle and abnormal weight gain during pregnancy. Physical inactivity is a major risk factor (OR=29.290) for weight gain over the ideal range, during pregnancy. Similar data to those obtained by us were highlighted by Haakstad et al. in 2007, which were relevant for pregnant women in the third trimester (Haakstad et al., 2007). A meta-analysis conducted in 2013, which included the analysis of 11 studies, concluded that aerobic exercise plays a role in weight gain control during pregnancy (Lamina & Aqbanusi, 2013). Activities such as swimming, aerobic exercise or walking cannot pose risks to maternal or fetal health (Korsten-Reak, 2010). Like us, Ghodsi et al. demonstrated in their research that there is a positive significant correlation between a sedentary lifestyle and weight gain during pregnancy. In their opinion, the effort performed (aerobic or anaerobic) influences the importance of the results obtained; however, this study did not establish differences between the types of activities (Ghodsi & Asltoghiri, 2012a).

Regarding birth weight, our results were statistically significant. Some literature data support our results, and some do not (Ghodsi & Asltoghiri, 2012b). One of the studies that established a connection between physical activity and birth weight was that of Marquez-Sterling et al.; however, their data were not statistically significant (Marquez-Sterling et al., 2000). Contrary to the data obtained in this research, Clapp et al. showed in a paper published in 2000 that the initiation of a physical activity program among pregnant women did not affect weight gain during pregnancy, birth weight, or head circumference, but significantly influenced placental growth (Clapp et al., 2000). Neither the analysis performed in this sample nor those performed in other samples demonstrated a significant influence of a sedentary lifestyle on gestational age. Many results such as those mentioned were published between 2006-2010 (Mothari et al., 2010; Dun Comb et al., 2006; Orr et al., 2006; Barakat et al., 2008).

In this research, no significant correlations were found between physical activity and a reduced risk of birth through cesarean section. However, there are literature studies that show a positive correlation between physical activity and a decrease in the rate of cesarean births. The data found were representative especially for regular moderate or high-intensity exercise performed in the third trimester of pregnancy. An important factor in this area of physical activity is education among pregnant women regarding the benefits of exercise (Barakat et al., 2012; Wu et al., 2013).

In our sample, we observed significant positive correlations between the level of education of pregnant women and the level of physical activity. A greater proportion of women with a higher level of education practiced physical activity. It seems that the most important reason for reducing the level of physical activity during pregnancy is the lack of education in this area. The most important concern discovered in this sense is fetal harm (Weir et al., 2010).

Following an analysis of our data compared to the literature data (Table III), we consider it important to continue research in order to determine the precise benefits of PA on the health of pregnant women, fetuses, infants,

or pregnancy outcomes. Also, imposing a level of physical activity associated with the effort zone (aerobic, anaerobic - lactacid, alactacid) is of particular importance, to establish a physical activity program in pregnant women.

Table III

Comparative results of the correlations between PA and certain parameters analyzed.

Indicator	Our research	Literature
Weight gain during pregnancy	Positive correlation	Positive correlation or no correlation
Newborn weight	Positive correlation	Positive correlation or no correlation
Gestational age	No correlation	No correlation
Cesarean birth	No correlation	Positive correlation
Level of education	Positive correlation	Positive correlation

Conclusions

1. Physical inactivity is a major risk factor for abnormal weight gain during pregnancy.

2. The lack of PA represents a risk factor for having a newborn with a weight that may not fit in the current recommendations.

3. Increasing the level of education is positively correlated with an increase of PA during pregnancy.

4. Physical inactivity in this group was not correlated with a higher rate of birth through cesarean section, compared to active subjects.

5. Premature/postmature birth was not influenced by the mother's physical activity level in this sample.

6. Initiation of physical activity among pregnant women is not a negative factor in pregnancy evolution.

Conflicts of interest

There are no conflicts of interest concerning the results or methodology of the study.

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Body Mass Index - a referential parameter of the female selection in hurdling

Indicele de masă corporală - parametru de referință în selecția permanentă la alergările de garduri - fete

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Abstract

Background. It is well known that children are not exact copies of their adulthood, disparities occurring in their build, even substantially, from one age to another, in the ontogenetic development. The modelling and reshuffling processes are ubiquitous throughout the auxological evolution of an individual, until the age of approx. 25 years. The physical growth and development processes are not always linear or synchronous and harmonious throughout this evolution. Sometimes this process suffers a sinuous route, even unpredictable with remarkable leaps during puberty, with the occurrence of some intersegmental temporary asymmetries and disproportions. In sports these aspects can positively or negatively influence the individual performance.

Aims. Our study aimed at critically analyzing the manner in which the Body Mass Index (BMI) should be worked out, during the ”tumultuous” period (around puberty), during the ontogenetic evolution of selected female athletes in the hurdles event. Thus, we are aiming to avoid the misinterpretation of the Body Mass Index at ages up to 18 years, frequently known as improper terms such as “undermuscled” or “underweight”.

Methods. Based on a personal analysis following several longitudinal studies, we have developed five ideal somatic scales being categorized into five stages: before the onset of menarche (stage 1), at the onset of menarche (stage 2), one year after the onset of menarche (stage 3), two years after the onset of menarche (stage 4) and over two years after the onset of menarche (stage 5). The followed parameters were: body height, body weight, lower limb length, body gravity center and body mass index.

Results. We set several interrelations among these indicators to anticipate an ideal somatic profile or pattern in high performance hurdling at an adult age (over 18 years old). Mainly, we followed the relationship between body weight, body height, body gravity center, all together related to the body mass index. Consecutively by use of a factorial analysis, we found that the reduced nominal value of the body mass index apparently places an athlete at pubertal age into an underweight category, subsequently presenting an ideal somatic pattern of a female athlete hurdler.

Conclusions. We propose to use our stadial pattern-scales during the initial and continuous selection process, in terms of favoring the future high performance indicators along with other motor parameters - morphokinetic (form, structure, technicality and fairness) and topokinetic (strength, vectors, velocity, amplitude and stamina). Thus, we hope to prevent a possible athletic career’s failure due to a disturbing overweight pattern of the athlete somatotype profile by failure to comply with our proposed pattern-scales.

Keywords: allometric pattern, auxology, undermuscled, underweight, somatotype.

Rezumat

Premize. Așa cum este arhicunoscut, copilul nu este o copie fidelă a adultului, între segmentele și organele sale apărând disparități, uneori substanțiale, de la o vârstă la alta, în evoluția sa onotogenetică. Procesele de modelare și remaniere corporală sunt omniprezente pe tot parcursul auxologic al evoluției unui individ, proces care se încheie la vârsta de cca. 25 de ani. Creșterea și dezvoltarea fizică nu sunt întotdeauna procese lineare, sincrone și armonioase, pe parcursul acestei evoluții. Acest proces suferă uneori un parcurs sinuos, chiar imprevizibil, cu momente caracterizate prin salturi remarcabile – specifice vârstei pubertare, chiar cu apariția unor asimetrii și disproporții intersegmentare temporare. În sport, aceste aspecte pot influența pozitiv sau negativ performanțele individuale.

Obiective. Studiul de față își propune să analizeze critic modul în care Indicele de Masă Corporală (IMC) ar trebui interpretat, pe parcursul unei perioade mai agitate (peripubertară) în evoluția onotogenetică a unor fete, selectate pentru atletism în probele de garduri. Dorim, astfel, să evităm interpretarea greșită a Indicelui de Masă Corporală, la vârste sub 18 ani, regăsită sub termeni de genul „submusculos” sau „subponderal”.

Metode. Pe baza unor analize personale, rezultate din studii longitudinale, am elaborat cinci grile somatice, considerate ideale, grupate în cinci stadii: înaintea instalării menarhei (stadiul 1), la instalarea menarhei (stadiul 2), după un an de la instalare, (stadiul 3), după doi ani (stadiul 4), și la peste doi ani de la instalare (stadiul 5). Parametrii urmăriți au fost: înălțimea corporală, greutatea corporală, lungimea membrului inferior, centrul de gravitație al corpului și indicele de masă corporală.

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Rezultate. Între acești indicatori am stabilit interelații care să anticipeze un profil sau pattern somatic ideal al alergătoarei de garduri, la nivel de performanță, la vârstă adultă - peste 18 ani. Am urmărit, în principal, relațiile dintre greutate, înălțime și centrul de gravitație a corpului, toate raportate și la idicele de masă corporală. În urma unei analize factoriale, am constatat că valoarea nominală redusă a indicelui de masă corporală încadrează, în mod aparent, o atletă la vârstă pubertară, în categoria de subponderalitate, ulterior, la vârstă adultă, acesta prezentând un profil somatic ideal pentru proba de garduri.

Concluzii. Propunem utilizarea grilelor stadiale, realizate de noi, în procesul de selecție inițială și de parcurs, ca indicatori factoriali favorizanți ai performanțelor ulterioare, alături de cei de natură motrică - morfocinetici (formă, structură, tehnicitate și corectitudine) și topocinetici (forță, vectori, viteză, amplitudine, rezistență). Se elimină astfel eșecul în cariera sportivă, datorată unei supraponderalități perturbatoare, prin neîncadrarea în grilele pattern propuse de noi.

Cuvinte cheie: pattern alometric, auxologie, submusculos, subponderal, somatotip.

Background

The physical growth and development of individuals, in terms of their physio-morphogenetic evolution, is not always a synchronous and harmonious ascending linear process. Between the regions and segments of an individual's body, certain disparities may occur during ontogenetic evolution. Body growth, modeling or remodeling and proportioning processes are present throughout the auxological evolution of an individual, a diachronic process that ends around the age of 25 years old. Sometimes, this evolutionary process takes a sinuous, even unpredictable course, with several moments characterized by remarkable saltatory steps, specific to pubertal age, or with the occurrence of some temporary intersegmental asymmetries and disproportions. Studies regarding these aspects have been performed by many authors (Rolland-Cachera et al., 1991; Rolland-Cachera et al., 2002; Cameron, 2007; Lemaire et al., 2014; Nummia et al., 2014).

Therefore, we cannot discuss about a general pattern or "allometric pattern" of ontogenetic evolution (Zelditch et al., 2003), valid for all individuals. The laws of physical growth and development are clearly fundamental in terms of diversity of evolution but also related to the variability and specificity of human ontogeny, under a multifactorial genotypic (internal) and phenotypic (external) influence. The functional echoes of these morphological and structural developments are ubiquitous, sometimes exceeding the normal limits, with more or less obvious dysfunctions, even pathological in nature, or on the contrary, with outstanding performance surpluses (Ribeiro et al., 2006; Pappai et al., 2012).

Sports selection was one of my personal concerns in my teaching and coaching career, one of the interesting running races being female hurdling on short distances (60 m and 100 m).

Based on observations as well as on my experience of over 25 years of high performance athletic activity, I found that a difficult problem in the selection of young athletes consists of anticipating the somatic constitution of a future teenager or adult female hurdle runner by investigating 9-11-year-old girls anthropometrically and somatoscopically, during the initial selection (Neagu, 2010). Since there are no accurate tools allowing to prefigure this body image, "the coach's eye" (A/N), which can see the future through a mental acceleration of the somatic evolution of these girls, can play a role. There are real limits to the coach's "eye" looking at "tomorrow's" adolescent body, based on "today's" somatoscopic assessment of the prepubescent individual (Fig. 1).

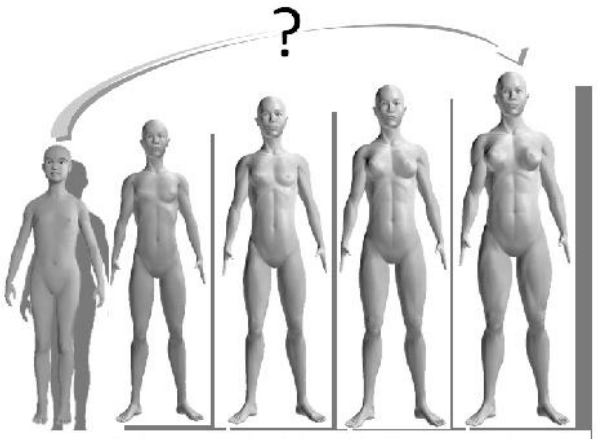

Fig. 1 – The limits in predictability of the future corporal image, based on somatoscopic assessment of a prepubescent individual.

Many specialized studies reveal that there are no certainty correlations proving that a female athlete who achieves outstanding results at a young age will obtain excellent sports performance as a junior or senior (Monsma & Malina, 2005; Tróznai & Pápai, 2008). I often saw in my coaching career young athletes who at the age of 10-12 years were in the top national novice II and I rankings. As they grew older, those girls, usually small in stature, robust, powerful, fast, well-coordinated and resilient, became more and more massive, heavier, and in a short time they no longer coped with the increasingly demanding requirements of high performance sports training. These so-called "athletic hopes" disappeared from the athletics tracks, without even reaching the junior II category (15-16 years) (Fig. 2). For many years I wondered why this happened. It was only after a long time that I found the answer - the reconfiguration and (re)prioritization of the sports selection criteria (Neagu, 2010).

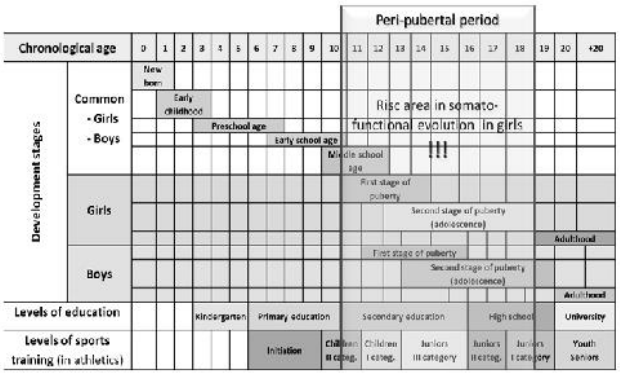

Fig. 2 – Timeline of individuals in the sports training process. Adaptation after (2).

Aims

It is known that for each sport there is an ideal somatotype that strongly correlates with the dynamic requirements and particularities of that sport - motor capacity, functional, energetic and metabolic, psychological parameters, etc. (Tróznai & Pápai, 2008). In athletics, the selection criteria in the initial stage (detection phase) are of motor nature, par excellence. They evidence the current level of the motor skills (motor qualities) of interest through a comprehensive battery of tests, the individual results being converted to scalar points that rank the tested children.

In time, a "critical area" (A/N) takes shape, due to the exclusion from baseline criteria of the ideal individual somatotype, complemented by the psychotype and finally by the physiotype, into which the athlete should fit (Claessens et al., 1999). For these criteria there are no standardized tests, score grids or ranking points. All these indicators form a "multiplex referential factor" (A/N) with different levels of influence: from a determining to a favoring, then a neutral (the so-called "zero factor") and finally, a disturbing factor. The pubertal period represents such a factor (Benedet et al., 2014; Himes et al., 2004).

This "trap", in which many sports teachers and coaches (especially inexperienced) are caught, makes them disregard other relevant criteria, which we subsume to the intension of the term "permanent selection screening " (A/N) in high performance athletics (Fig. 3).

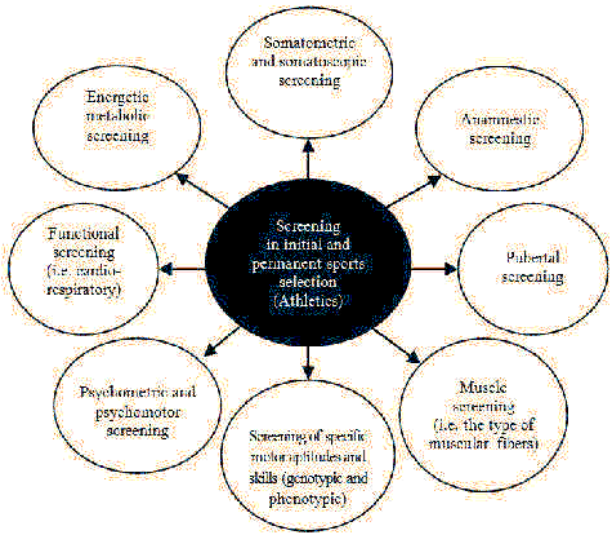

Fig. 3 – Screening in initial and permanent sports selection.

Methods

A critical analysis of how the Body Mass Index (BMI) should be interpreted is particularly necessary in the context of correlative somatic indexes during the peripubertal period of selected girls in hurdling (Garrido-Chamorro et al., 2009). This allows avoiding the misinterpretation of the BMI level (with lower nominal values than those considered normal) at ages under 18, when certain individuals are erroneously classified as "undermuscled" or "underweight". This is why we have developed predictive grids, considered as ideal models in female hurdling, as predictive references for post-puberty age. The early identification of the gaps against these profiles can allow highly effective measures and the avoidance of risks and failures. Failures can be explained by an inadequate management of the training process, eluding the somatic and functional aspects of athletes, as possible disturbing factors (Neagu, 2010).

In a longitudinal study over 15 years, we investigated this aspect, monitoring four quantitative somatic parameters:

Body Height (BH)
Lower Limb Length (LLL)
Body Gravity Center (BGC)
Body Weight (BW)

In terms of somatic qualitative parameters, we calculated the following percentage ratios between the quantitative parameters:

Body Weight per Body Height (BW/BH x 100)
Lower Limb Length per Body Height (LLL/BH x 100)
Body Gravity Center per Body Height (BGC/BH x 100)

Later, we added to these parameters the Body Mass Index (BMI) as an additional element in our analysis and as an important referential parameter, calculated using the formula:

BMI = **BW** (kg) / **BH²** (m)
in which:

BMI = body mass index
BW = body weight
BH = body height

Finally, we developed, based on several representative samples of subjects, five predictive stadial somatic grids as ideal referential patterns for female hurdles: before the onset of menarche (stage 1), at the onset of menarche (stage 2), one year after the onset of menarche (stage 3), two years after the onset of menarche (stage 4) and over two years after the onset of menarche (stage 5) (Fig. 4).

PREDICTIVE IDEAL SOMATOTYPES AT PUBERTAL AGE
(Hurdles runners - girls)

Body height (cm)	Somatotype 1 (prepubertal age) BW/BH=24%±2%				Somatotype 2 (onset of menarche) BW/BH =26%±2%				Somatotype 3 (one year after the onset of menarche) BW/BH =28%±2%				Somatotype 4 (two years after the onset of menarche) BW/BH=32%±2%				Somatotype 5 (over two years after the onset of menarche) BW/BH =34%±2%			
	BW (kg) 24%	BGC (cm) 58%	LLL (cm) 53%	BMI ↓	BW (kg) 26%	BGC (cm) 58%	LLL (cm) 53%	BMI ↓	BW (kg) 28%	BGC (cm) 57,5%	LLL (cm) 52%	BMI ↓	BW (kg) 32%	BGC (cm) 57%	LLL (cm) 52%	BMI ↓	BW (kg) 34%	BGC (cm) 56,5%	LLL (cm) 52%	BMI ↓
140	33.60	81.20	74.20	17.14																
142	34.08	82.36	75.26	16.90																
144	34.56	83.52	76.32	16.67																
146	35.04	84.68	77.38	16.44	37.96	84.68	77.38	17.81												
148	35.52	85.84	78.44	16.22	38.48	85.84	78.44	17.57												
150	36.00	87.00	79.50	16.00	39.00	87.00	79.50	17.33	42.00	86.25	78.00	18.67								
152	36.48	88.16	80.56	15.79	39.52	88.16	80.56	17.11	42.56	87.40	79.04	18.42								
154	36.96	89.32	81.62	15.58	40.04	89.32	81.62	16.88	43.12	88.55	80.08	18.18								
156	37.44	90.48	82.68	15.38	40.56	90.48	82.68	16.67	43.68	89.70	81.12	17.95	48.36	88.92	81.12	19.87				
158	37.92	91.64	83.74	15.19	41.08	91.64	83.74	16.46	44.24	90.85	82.16	17.72	48.98	90.06	83.74	19.62				
160	38.40	92.80	84.80	15.00	41.60	92.80	84.80	16.25	44.80	92.00	83.20	17.50	49.60	91.20	84.80	19.38	54.40	90.40	84.80	21.25
162					42.12	93.96	85.86	16.05	45.36	93.15	84.24	17.28	50.22	92.34	85.86	19.14	55.08	91.53	85.86	20.99
164					42.64	95.12	86.92	15.85	45.92	94.30	85.28	17.07	50.84	93.48	86.92	18.90	55.76	92.66	86.92	20.73
166	→				43.16	96.28	87.98	15.66	46.48	95.45	86.32	16.87	51.46	94.62	87.98	18.67	56.44	93.79	87.98	20.48
168									47.04	96.60	87.36	16.67	52.08	95.76	89.04	18.45	57.12	94.92	89.04	20.24
170	→								47.60	97.75	88.40	16.47	52.70	96.90	90.10	18.24	57.80	96.05	90.10	20.00
172													53.32	98.04	91.16	18.02	58.48	97.18	91.16	19.77
174													53.94	99.18	92.22	17.82	59.16	98.31	92.22	19.54
176	→												54.56	100.32	93.28	17.61	59.84	99.44	93.28	19.32
178																	60.52	100.57	94.34	19.10
180	→																61.20	101.70	95.40	18.89

Fig. 4 – The five predictive somatotype grids at pubertal age (hurdles runners - girls).

For each stage we set up an ideal pattern with optimal interrelations between the studied parameters: Body Height (BH); Lower Limb Length (LLL); Body Gravity Center (BGC); Body Weight (BW). The graphical representation for each stadial profile is shown in Figs. 5-9.

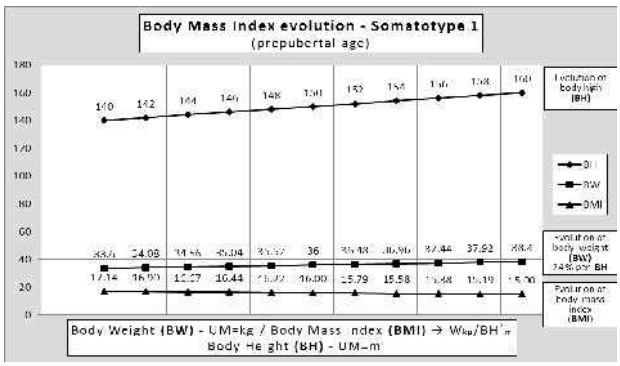

Fig. 5 – The ideal somatotype – stage 1.

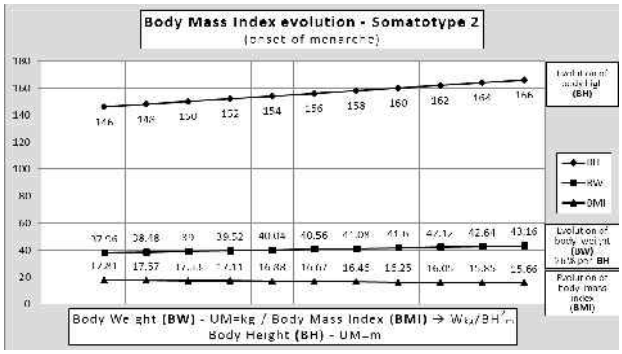

Fig. 6 – The ideal somatotype – stage 2.

Results

The measurements made and the correlations between the monitored parameters allowed us fitting (or not) the future female hurdler' somatotype into the pattern grid, starting with pubertal age. In this way, we could anticipate the future somatic profile, guiding and adjusting the permanent selection and training process, as an important reference in the progression of the hurdler.

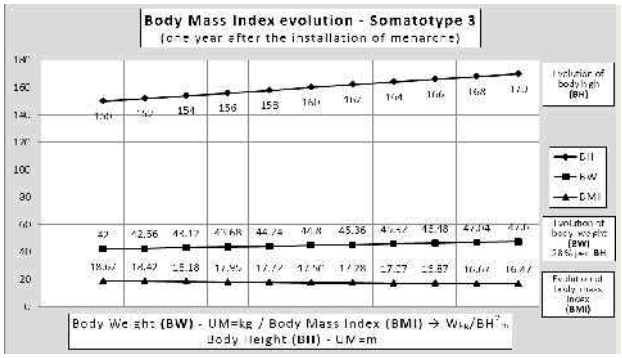

Fig. 7 – The ideal somatotype – stage 3.

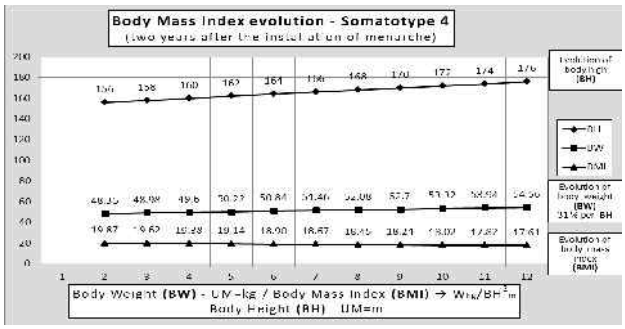

Fig. 8 – The ideal somatotype – stage 4.

Discussions

Having our stadial profiles as a reference, we were able to follow up the progress of our athletes over several years, based on individual records. We used for comparison databases from France, on cohorts of subjects between 1-18 years old (1) (Fig. 12). We present two study cases as examples of the application of the profile grids proposed by us in the practice of training (as ideal patterns). In the case study no. 1, the subject fit into the pattern-grid (Fig. 10). Subsequently, the athlete obtained remarkable results as a junior and senior (national champion and medalist in a number of official competitions). In the study case no. 2, the subject did not fit into the grid (Fig. 11). Subsequently, the athlete did not achieve remarkable results as a junior. After a short period and very modest results, she quit high performance sport.

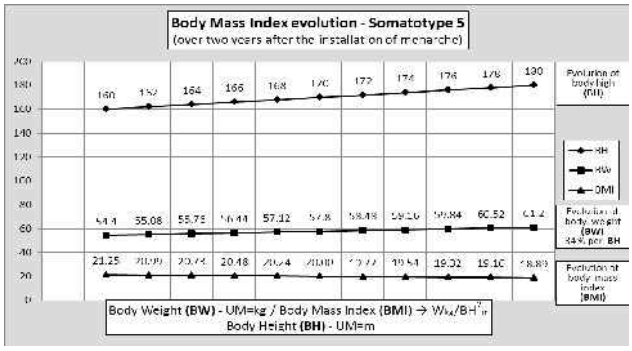

Fig. 9 – The ideal somatotype – stage 5.

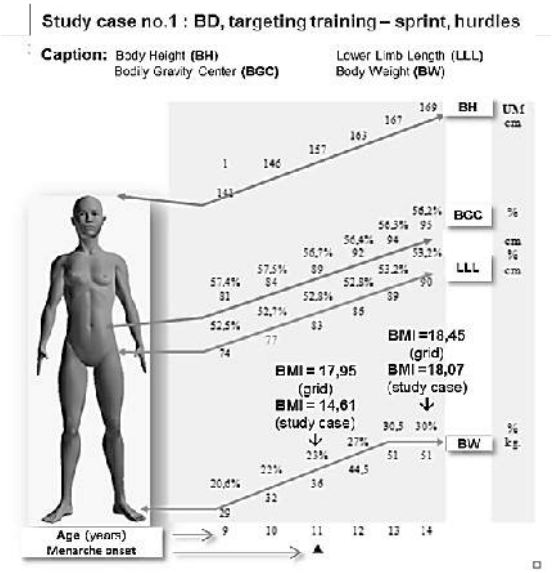

Fig. 10 – Example of a somatotype that fits into the predictive grid.

In both cases, the Body Mass Index (BMI) at the onset of menarche had values of 14.61 (study case no. 1) and 15.40 (study case no. 2). With aging, BMI increased, reaching almost equal values, 18.07 (study case no. 1) and 18.03 (study case no. 2). By analyzing the individual records, we found that a disturbing factor was the increased BMI = 15.40 in study case no. 2 compared to 14.61 in study case no. 1. This was the first sign of inconsistency in

the grid. The second disturbing factor for subject no. 2 was the decrease of the Body Gravity Center (BGC) by almost 2%, from 58% at the onset of menarche to 56.5% two years after the onset of menarche. Case no. 2 accumulated adipose body mass in the lower limbs with negative consequences on hurdling biomechanics and technique. The BGC evolution of subject no. 1 remained relatively unchanged, with a value of 56.7% at the onset of menarche and 56.2% approx. two years after the onset of menarche.

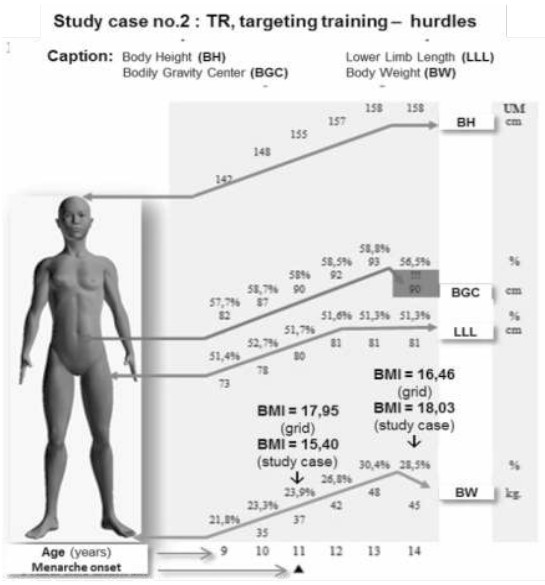

Fig. 11 – Example of a somatotype that does not fit into the predictive grid.

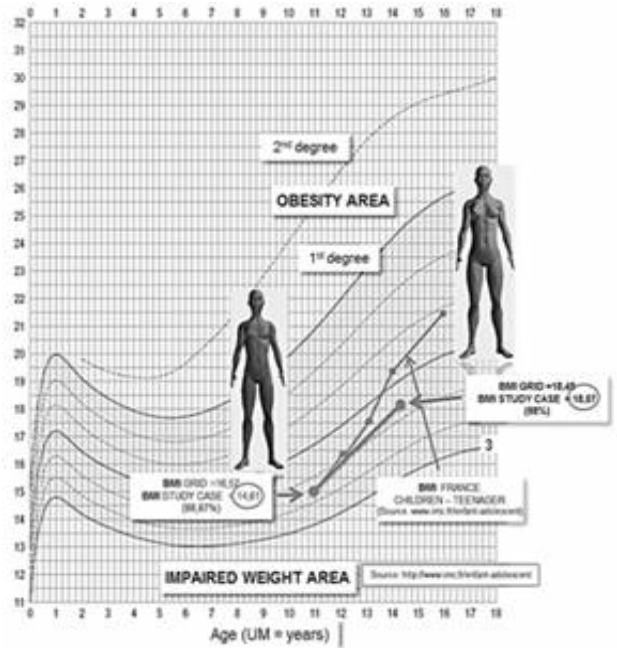

Fig. 12 – Comparison of BMI evolution curves in France (children and teens - girls) and in our predictive models.

Conclusions

1. The sports training of female hurdlers can still be optimized by increasing the degree of predictive and objective parameterization of their somato-functional evolution.

2. Using predictive grids exceeds the discursive framework (sometimes elusive, subjective and limited) of somatic development prediction (e.g. based only on momentary somatoscopic examination). These will provide important objective and complementary references to permanent selection in athletics.

3. The level and the evolution of BMI become important parameters alongside the other somatic indicators (quantitative and qualitative), by comparison with normal values.

4. Our analysis shows that the BMI value should be 88-89% of normal values (reference French database, girls, 11-13 years) in the 1st and 2nd stages (pre-pubertal and pubertal), and 96-98% in the 3rd and 4th stages (post-puberty, 14-16 years). We found that any value exceeding these limits led in time to "overweight" from the perspective of hurdling requirements.

5. The correct interpretation of BMI must be put in the context of dynamic and biomechanical requirements of hurdling. A special emphasis should be placed on optimizing the "ballistic component" (A/N) of hurdling. This is the only way to pass from "contiguity to continuity" (A/N) in the hurdles race.

6. Any isolated interpretation of BMI can generate validation errors if the body composition is not taken into account (e.g. the active/passive body mass ratio). This will be a focus of our future researches.

7. An interdisciplinary approach to our future research is necessary, by complementing our team with other specialists in medical disciplines, as a real support in the validation of the research results. This is another development objective that we pursue.

Conflicts of interests

Nothing to declare

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The effect of physical therapy on the improvement of the quality of life in rheumatoid arthritis patients
Îmbunătățirea calității vieții pacienților cu artrită reumatoidă prin fizioterapie

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Abstract

Background. Rheumatoid arthritis is a chronic multisystem autoimmune disease with unknown etiology, progressive evolution, and increased incidence in the adult population (0.5-1% of the world's population); it can lead to severe deterioration of the patients' functional abilities.

Physical therapy is a non-pharmacological treatment method aimed to reduce inflammation and pain in rheumatic diseases.

Aim. To evaluate the effects of physical therapy on the improvement of the patients' health-related quality of life.

Methods. An interventional, longitudinal, prospective study was designed, which included 100 patients (50 patients with rheumatoid arthritis and 50 patients with osteoarthritis) from the Rheumatology Clinic, Emergency County Hospital – Cluj-Napoca. The patients had a first course of physiotherapy at the baseline of the study, which was repeated after 6 months. Evaluation was performed by completing the Health Assessment Questionnaire (HAQ) and the Visual Analogue Scale of Pain (VAS).

Results. Statistically significant differences in HAQ scores were identified when comparing baseline data and re-evaluation data after 6 months (the Friedman ANOVA test, $p<0.005$). The interpretation of VAS showed a decreased pain perception at the end of treatment compared to the beginning of treatment.

Conclusions. Significant positive short-term results were found regarding the patients' quality of life, pain relief, joint mobility and functional status. There is a need for future studies in order to obtain standardized rehabilitation programs.

Keywords: quality of life, rheumatoid arthritis, rehabilitation, physical therapy.

Rezumat

Premize. Artrita reumatoidă este o boală cronică autoimună multisistemică de etiologie necunoscută, cu caracter progresiv, cu o incidență mare (0,5-1% din populația lumii) la persoanele adulte, care poate duce la deteriorarea severă a abilităților funcționale ale pacienților.

Fizioterapia este o metodă de tratament non-farmacologică, utilizată în tratarea bolilor reumatice, având efecte antiinflamatorii și antialgice.

Obiective. Evaluarea efectului fizioterapiei din punct de vedere al creșterii calității vieții, la pacienții cu artrită reumatoidă.

Metode. A fost realizat un studiu intervențional longitudinal prospectiv, care a inclus 100 de pacienți ai Clinicii Reumatologice, Spitalul Clinic Județean de Urgență – Cluj-Napoca, 50 de pacienți cu artrită reumatoidă și 50 de pacienți cu artroză. Pacienții au efectuat o primă cură de fizioterapie la începutul includerii în studiu și au repetat cura la 6 luni. Evaluarea pacienților s-a efectuat prin complectarea chestionarelor Health Assessment Questionnaire (HAQ) și a Scalei Analog Vizuale a durerii (VAS).

Rezultate. S-au identificat diferențe semnificative statistic în ceea ce privește scorurile HAQ la compararea datelor inițiale cu cele din a doua cură (Testul Friedman ANOVA, $p<0,005$). Interpretarea scalei analog vizuale a durerii a arătat scăderea percepției pacienților asupra durerii resimțite la finalizarea tratamentului, în comparație cu începutul tratamentului.

Concluzii. S-au remarcat rezultate pozitive pe termen scurt privind creșterea calității vieții pacienților, scăderea durerii, creșterea mobilității articulare, îmbunătățirea statusului funcțional. Se impune necesitatea de viitoare studii în vederea obținerii de programe de reabilitare ce pot fi standardizate.

Cuvinte cheie: calitatea vieții, artrită reumatoidă, recuperare, fiziokinetoterapie.

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Introduction

The quality of life is a multidimensional concept that includes all aspects of the patient's life, physical, functional, emotional, social and spiritual. It shows an individual's self-perception of their expectations, standards and concerns in the context of the culture and value system in which they live (***, 1995). Physical, mental, social well-being, the capacity to fulfill daily tasks/independence, interpersonal relationships, self-assertion and social integration are the parameters that define the quality of life (Carr et al., 2005).

Inflammatory rheumatic diseases are chronic, progressive and disabling disorders that have a negative effect on the patients' quality of life, leading to important functional, socio-professional, cultural limitations. Regarding the improvement of the patients' quality of life, the following objectives are evidenced, which require finding solutions: personal finances, being an active person involved in society, socialization, health; cultural perspectives should also be given importance (Liedberg et al., 2012). At international level, there is an increasing interest in chronic diseases and the economic problems they cause for both the disabled individual and the entire society (Calfova et al., 2011). There is a need to find specific, effective solutions and methods in order to reduce these limitations and allow patients to live the best possible life.

Rheumatoid arthritis (RA) is a chronic multisystem autoimmune inflammatory disease, with progressive evolution, unknown etiology, and a high incidence in the adult population. It is characterized by an arthropathy with deforming and destructive evolution, as well as with multiple systemic manifestations that may lead to severe deterioration of the patients' functional abilities (Ferreira et al., 2008). The disease onset occurs at a young age, usually between 30-50 years, but the disease can develop at any age, predominantly affecting women. It affects about 0.5-1% of the world's population.

Non-surgical drug therapy includes the application of hot and cold procedures, splints and orthoses, therapeutic exercises, occupational therapy, assistive equipment, education for the protection of the affected joints, education for energy conservation (1).

Osteoarthritis or arthrosis (OA) belongs to the group of degenerative rheumatic diseases and is characterized by a deterioration of the joint cartilage, accompanied by an increase of subchondral bone activity. It is the most frequent rheumatic disease; its incidence increases with age, with a peak between 55 and 75 years. About 10% of the population aged over 60 years is affected by osteoarthritis, with a predominance of women (2/1). The etiology of osteoarthritis is unknown; age, genetic predisposition, mechanical stress, inflammatory joint disease are taken into consideration.

The physical therapy of osteoarthritis is aimed at reducing pain, improving mobility in the affected joints and stopping the disease evolution by diminishing joint strain (prophylaxis through activities of daily living - ADLs, weight loss in overweight patients, possibly a change of the workplace). Physical therapy involves kinesiotherapy for the restoration of joint mobility and the prevention of muscle atrophy due to inactivity, as well as electrotherapy and thermotherapy for the reduction of inflammation, periarticular muscle contracture, and pain (Popescu & Ionescu, 2002).

Objectives

This study aimed to assess the effect of physiokinesiotherapy on the quality of life of patients with rheumatoid arthritis and osteoarthritis. Another objective of the study was to evaluate rehabilitation treatment by adding electrotherapy in the case of some patients, and to compare changes in the values of the Health Assessment Questionnaire (HAQ) and the Visual Analogue Scale of Pain (VAS).

Material and methods

Research protocol

a) Period and place of the research

The study was approved by the Ethics Commission of the "Iuliu Haţieganu" University of Medicine and Pharmacy Cluj-Napoca (Approval no. 540/13.12.2012).

The study was carried out at the Rheumatology Clinic of the Emergency County Hospital Cluj, in the Rehabilitation Therapy Laboratory (the physical therapy facility). This was a prospective longitudinal experimental study, spanning a period of 2 years, between September 2013 and September 2015.

b) Subjects and groups

The study group included 100 patients, of which 50 patients with rheumatoid arthritis and 50 patients with osteoarthritis. The inclusion criteria were positive diagnosis, the indication of a physical therapy rehabilitation program, and patient compliance. The exclusion criteria were non-compliance to treatment, chronic decompensated disease, mental disorders, neoplasia. An exclusion criterion for the performance of electrotherapy was the presence of inflammatory syndrome. All the subjects included in the study signed an informed consent form.

c) Tests applied

The study protocol included functional evaluation and rehabilitation treatment.

Functional evaluation was performed using the Health Assessment Questionnaire (HAQ) and the Visual Analogue Scale of Pain (VAS).

The treatment plan was elaborated in 2 stages: initial rehabilitation treatment including 10 sessions, then re-evaluation and 10 rehabilitation treatment sessions after 6 months.

In the first stage, the patients were evaluated based on the Health Assessment Questionnaire and the Visual Analogue Scale of Pain at the beginning and at the end of the treatment course. In the second stage, HAQ was evaluated during treatment and VAS was assessed at the beginning and at the end of the period.

The rehabilitation treatment was developed according to the American College of Rheumatology/The European League Against Rheumatism (ACR/EULAR) criteria: current clinical manifestations of the disease; the patients' symptoms and prognostic factors (disease activity/ inflammation, pain, level of functionality/disability);

individual factors (sex, age), comorbidities, concomitant medication; the patients' wishes and expectations.

The treatment plan included electrotherapy and kinesiotherapy.

Electrotherapy consisted of the application of electrotherapeutic procedures (ionization and ultrasound) to the affected regions, with an analgesic, anti-inflammatory and decontracturing indication.

Electrotherapeutic procedures were performed in treatment rooms intended for these procedures, under optimal physical and mental comfort conditions for the patient.

The physical therapy equipment used was that of the Treatment Facility of the Rheumatology Clinic.

All patients underwent kinesiotherapy, but only some of them also benefited from electrotherapeutic procedures, which were the differentiating factor. The procedures were prescribed based on the therapeutic indications required by the disease status at that time (presence of inflammatory syndrome, which represented an exclusion criterion for electrotherapy).

Kinesiotherapy consisted of physical exercise programs specific for each individual disorder. The following were used: posturing, passive, passive-active and active exercises, isometric and isotonic exercises for the restoration of joint mobility, the restoration of muscle force and the reduction of pain, relaxation exercises, breathing exercises, taking into consideration the patients' symptoms and needs. An individual physical exercise program was developed for each patient depending on diagnosis and the objectives to be attained; this program could be adjusted every day if necessary, depending on the patient's functional status.

HAQ allows an evaluation of the patient's daily activities and subjective well-being. It investigates the ability to perform 20 daily activities, each with 4 categories of possible answers (without difficulty – score 0, with some difficulty – score 1, with high difficulty – score 2, impossibility to perform – score 3). The 20 activities are classified into 8 categories with 2-3 subitems. Calculation is performed based on the highest score for each activity of each subcategory. Patients are also asked about the use of assistive equipment or whether they need the assistance of people around them (Uhlig et al., 2006).

VAS provides information about the patient's perception of pain at a given moment. The patient is asked to score the pain felt on an analogue scale from 1 to 10.

d) Statistical processing

Quantitative variables were summarized as mean ± standard deviation for normally distributed data, and as median and the interval between the first quartile (the 25th percentile) and the third quartile (the 75th percentile) in the contrary case. Qualitative variables were summarized as absolute or relative frequencies and were graphically represented as pie charts or columns.

Comparisons between normally distributed quantitative variables in the three studied groups were made via the ANOVA test, and the Friedman ANOVA test was used for quantitative variables without a normal distribution. Paired samples were compared by applying the Sign test at a significance threshold of 1.7%. Quantitative variables without a normal distribution of two independent samples were compared via the Mann-Whitney test. The comparison between two percentages was performed by applying the Z test, using the online application (2).

Statistical analysis was performed with the Statistica (StatSoft. v. 8) program and for graphic representations, Microsoft Excel was used. The level of significance applied when comparing the two groups was 0.05.

Results

The percentage of patients with RA who underwent electrotherapeutic procedures varied between 34% (17 patients on re-evaluation) and 44% (22 patients in the initial stage) (Fig. 1).

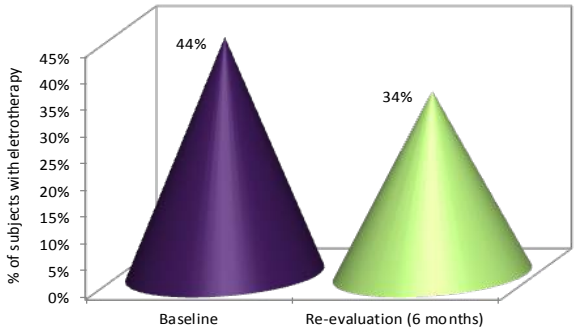

Fig. 1 – Percentage of patients with rheumatoid arthritis who underwent electrotherapeutic procedures.

The majority of osteoarthritis patients underwent electrotherapeutic procedures (50 patients during the initial stage, 46 on re-evaluation) (Fig. 2).

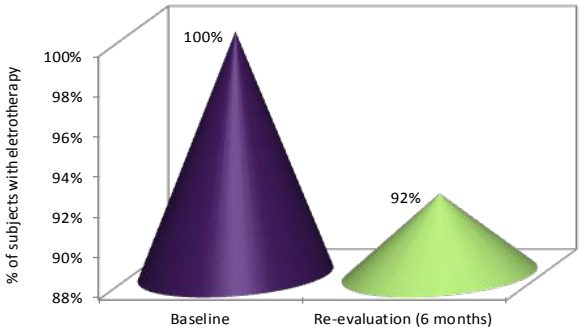

Fig. 2 – Percentage of patients with osteoarthritis who underwent electrotherapeutic procedures.

The interpretation of the Visual Analogue Scale of Pain evidences a decrease in the patient's perception of the pain felt at the end of treatment compared to the beginning of treatment (Figs. 3, 4, 5, 6).

In patients with rheumatoid polyarthritis, the median VAS was 8 (7-9) on the initial examination and decreased to 6 (6−8) on the examination at the end of the first course of physical therapy; the decrease was statistically significant (the Wilcoxon test: Z statistics = 5.10; $p<0.0001$).

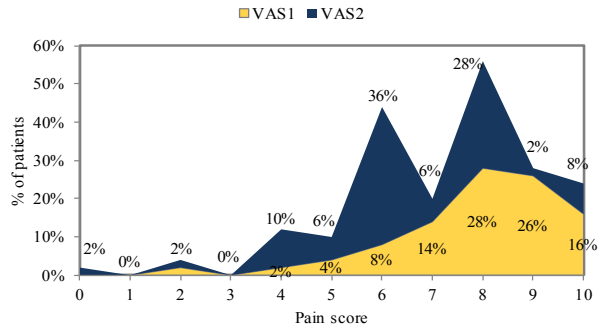

Fig. 3 – Distribution of VAS at the beginning (VAS1) and end (VAS2) of the first course of treatment in patients with rheumatoid arthritis.

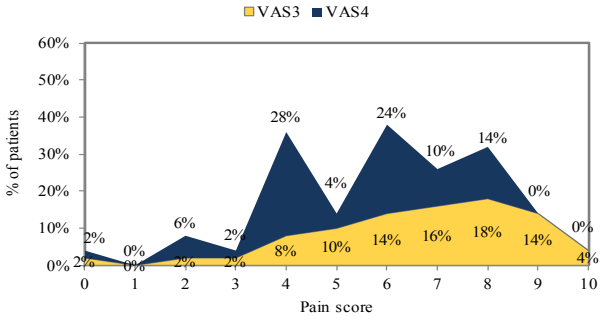

Fig. 4 – Distribution of VAS at the beginning (VAS3) and end (VAS4) of the second course of treatment in patients with rheumatoid arthritis.

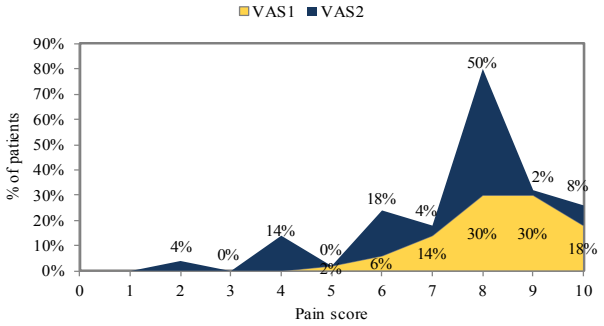

Fig. 5 – Distribution of VAS at the beginning (VAS1) and end (VAS2) of the first course of treatment in patients with osteoarthritis.

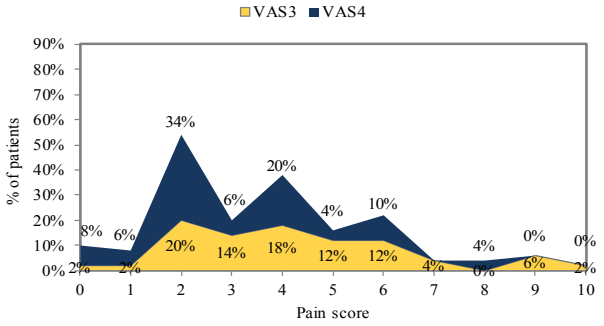

Fig. 6 – Distribution of VAS at the beginning (VAS3) and end (VAS4) of the second course of treatment in patients with osteoarthritis.

In patients with rheumatoid polyarthritis, the median VAS was 7 (5-8) 6 months after the first course of physical therapy and decreased to 6 (4-7) on the evaluation at the end of the second course of physical therapy; the decrease was statistically significant (the Wilcoxon test: Z statistics = 4.56; p<0.0001).

In patients with osteoarthritis, the median VAS was 8 (8-9) on the initial examination and remained at the value of 8 (6-8) at the end of the first course of physical therapy; the values were statistically significant (the Wilcoxon test: Z statistics = 5.17; p<0.0001). The median VAS was 4 (2.25-5.75) 6 months after the first course of physical therapy and decreased to 2 (2-4) on the examination at the end of the second course of physical therapy, the decrease being statistically significant (the Wilcoxon test: Z statistics = 4.70; p<0.0001).

A summary of the results collected following the administration of the Health Assessment Questionnaire to patients with RA is shown in Table I.

Table I
Results of the Health Assessment Questionnaire.

Statistical indicators	HAQ1 (n=50)	HAQ2 (n=50)	HAQ1 (n=50)
Minimum	0.50	0.63	0.25
Maximum	2.88	2.88	3.00
Median	1.88	1.88	1.75
1st quartile	1.53	1.63	1.38
3rd quartile	2.25	2.25	2.00

HAQ1 – before treatment; HAQ2 – at the end of the first course of treatment; HAQ3 – during the second course of treatment

For patients with RA, the Friedman ANOVA test identified statistically significant differences in HAQ scores (Chi-square statistics = 14.30, p = 0.00079; Fig. 7). Statistically significant differences were found when comparing initial data to those during the second course of treatment (Table II).

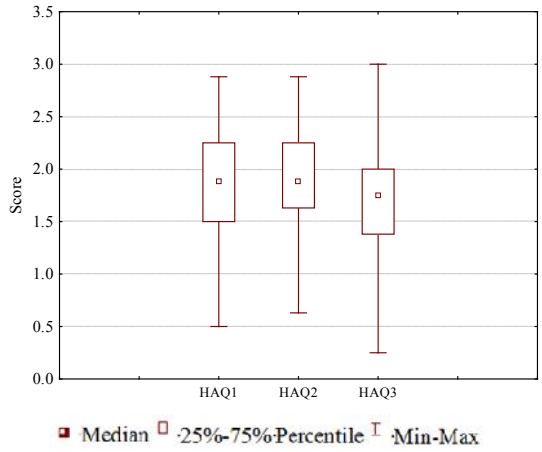

Fig. 7 – Statistical comparison of the three HAQ scores in patients with RA

Table II
Comparisons between HAQ1, HAQ2 and HAQ3 in patients with RA.

HAQ	Sign-value	p
HAQ1 vs. HAQ2	1.84 vs. 1.88	0.144
HAQ1 vs. HAQ3	1.84 vs. 1.67	0.049
HAQ2 vs. HAQ3	1.88 vs. 1.67	0.001

There were no statistically significant differences regarding HAQ or VAS scores in patients with electrotherapy compared to those with kinesiotherapy alone (Table III).

Table III

Results of the comparison of values between the groups of patients with and without electrotherapy (patients with RA).

HAQ/VAS	Electrotherapy 1				Electrotherapy 2			
	Z-value	p	n_{da}	n_{nu}	Z-value	p	n_{da}	n_{nu}
HAQ1	0.53	0.598	22	28	-0.01	0.991	17	28
HAQ2	0.44	0.660	22	28	0.27	0.788	17	28
HAQ3	0.14	0.892	22	23	-0.25	0.806	17	28
VAS1	0.31	0.755	22	28	-0.49	0.623	17	28
VAS2	-1.85	0.065	22	28	-1.44	0.150	17	28
VAS3	1.02	0.307	22	23	-1.09	0.276	17	28
VAS4	-0.91	0.364	22	23	-2.50	0.012	17	28

Legend

VAS1- beginning of the first course of rehabilitation treatment
VAS2 – end of the first course of rehabilitation treatment
VAS3 – beginning of the second course of rehabilitation treatment
VAS4 - end of the second course of rehabilitation treatment

A summary of the results collected following the administration of the Health Assessment Questionnaire to patients with osteoarthritis is shown in Table IV.

Table IV

Results of the Health Assessment Questionnaire

Statistical indicators	HAQ1 (n=50)	HAQ2 (n=50)	HAQ3 (n=45)
Minimum	0.75	0.50	0.00
Maximum	2.43	2.25	1.88
Median	1.75	1.75	1.13
1st quartile	1.50	1.25	0.75
3rd quartile	2.00	2.00	1.38

The Friedman ANOVA test in patients with OA identified statistically significant differences in HAQ scores (Chi-square statistics = 62.21, p < 0.0001; Fig. 8). Statistically significant differences were found when comparing initial data to data during the second course of treatment (Table V).

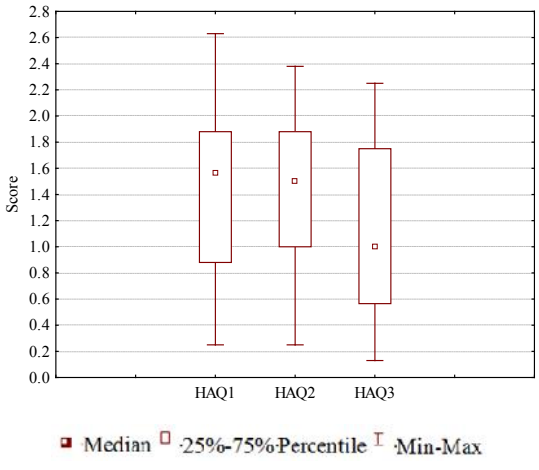

Fig. 8 – Statistical comparison of the three HAQ scores in patients with osteoarthritis

Table V

Comparisons between HAQ1, HAQ2 and HAQ3 in patients with osteoarthritis.

HAQ	Sign-value	p
HAQ1 vs. HAQ2	1.32	0.188
HAQ1 vs. HAQ3	6.26	<0.001
HAQ2 vs. HAQ3	5.88	<0.001

Discussions

The EULAR 11th recommendation regarding the management of early arthritis refers to the possibility of using non-pharmacological methods such as dynamic exercises, occupational therapy, hydrotherapy as adjuvant treatments in patients with RA. Many randomized clinical studies have shown that specific dynamic exercises for the affected joints can improve muscle strength and joint mobility, without clear effects on pain or disease activity. So far, no consensus about the optimal kinesiotherapeutic program has been reached. Regarding electrotherapy, results are controversial or, when positive effects are reported, these are related to short-term pain relief (Combe et al., 2007).

In our study, in patients with RA, we found a decrease of HAQ and VAS values, but this decrease was not more pronounced in patients who underwent additional electrotherapeutic procedures (p>0.05).

Of the 50 patients in the RA group, 22 persons also underwent electrotherapy during the first course of physiotherapy; their number decreased to 17 during the second course, after 6 months; in contrast, the majority of patients with OA underwent electrotherapeutic procedures (50 patients in the initial stage, 46 on reevaluation), during both courses of therapy. The cause of the absence of electrotherapeutic procedures was the activity stage of the disease or the development of other comorbidities.

There are many literature studies regarding the effects of physiotherapy and kinesiotherapy in inflammatory rheumatism. In a study, Buljina et al. monitored the effects of physiotherapy (thermal baths, hot or cold applications, galvanic baths and exercises) on the rheumatoid hand in a group of 50 patients and found, at least in the short term, an improvement in the functional status of these patients (Buljina et al., 2001). Rapoliene and Krisciunas studied the effects of occupational therapy (physiokinesiotherapy and ADL education) in a group of Lithuanian patients and observed an improvement in hand function after completion of the treatment course, which facilitated the activities of daily living in these patients (Rapoliene & Krisciunas, 2006).

Electrotherapy is one of the most frequently used physical therapy methods in the treatment of RA. A recent study in Poland investigated the effects of these procedures on pain relief in these patients. A significant decrease of pain was found, particularly in the group of patients undergoing a combination of electrotherapeutic procedures (Lesniewicz et al., 2014).

Metsios shows that therapeutic interventions through well-designed physical exercise programs in patients with RA lead to a reduction of fatigue, an improvement of cardiovascular activity and physiological status and ameliorate mental well-being, without the aggravation of symptoms, without negative effects on the disease activity or joint damage (Metsios et al., 2008).

The patients included in the study showed compliance with physiokinesiotherapy, with positive effects on physical and mental well-being, as evidenced by HAQ and VAS values. In the initial stage, regarding pain perception in patients with RA, the median VAS was 8 (7-9) at the

beginning of the rehabilitation treatment and decreased to 6 (6-8) after the 10 physical therapy sessions performed; in patients with OA, the median VAS was 8 (8-9) and remained at the value of 8 (6-8). In the second stage, when repeating the course of physical therapy, the median VAS was 7 (5-8) and decreased to 6 (4-7) in patients with RA, while in patients with OA, the median VAS was 4 (2.25-5.75) and decreased to 2 (2-4), which suggests that physical therapy reduced pain in both groups, with more obvious results in patients with OA, after the second course of physical therapy. The quality of life was improved in both groups, with a significantly greater improvement on re-evaluation, when median values reached 1.75 compared to 1.88 in the group with rheumatoid arthritis (Fig. 7) and 1.13 compared to 1.75 in patients with osteoarthritis. No statistically significant results were obtained regarding the increase of the quality of life and the reduction of pain in patients with RA who underwent electrotherapy in addition to kinesiotherapy.

In medical practice, the most significant indicator of disability is considered to be HAQ – the indicator of functional disability (Sokka et al., 2010).

We found that group therapy improved global evolution, bringing benefits for some subjective indicators (anxiety, patient motivation). In a study performed in Sweden, Ottenvall Hammar and Hakkansson showed that by adapting their needs to their own level of physical functionality and strength, by using assistive equipment for the compensation of deficiencies, by adjusting the surrounding environment, with the help of people close to them, patients with rheumatic diseases could acquire a good health status. The results demonstrated that training, drug therapy and care provided by the team of rheumatologists were closely related to an improvement in ADLs and the perception of a good health state (Ottenvall Hammar & Hakkansson, 2013).

Patients were advised to take daily walks, with the increase of the walking distance, bike rides, or to participate in organized events and trips. These activities, in addition to physical and mental benefits, allow to fight stress and improve sleep, ameliorating the quality of life, which is also confirmed by Bacconnier's study (Bacconnier et al., 2015).

Conclusions

1. A decrease in the values of HAQ and VAS scores at the end of the treatment period compared to the beginning of treatment was found in both groups.

2. Almost all patients with osteoarthritis underwent electrotherapeutic procedures, compared to the group of patients with RA (due to the contraindication given by the presence of marked inflammatory syndrome).

3. There were no statistically significant differences regarding HAQ and VAS scores in patients with RA who underwent electrotherapy compared to those without this treatment.

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgments

The article uses results from the research conducted as part of the first author's PhD thesis, in progress at the "Iuliu Haţieganu" University of Medicine and Pharmacy Cluj-Napoca.

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The Efficiency of Energy Recovery in an Elite Rowing Group
Eficiența procesului de recuperare energetică în cadrul unui grup elită din canotaj

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Abstract
Background. Optimizing recovery, in terms of energy, is an important step towards improving the practice of sports.
Aims. Identifying and connecting specific sports actions with practical nutrition activities, used to rehabilitate the athlete.
Methods. We initiated an observational cross-sectional study among a group of elite rowing athletes by monitoring RMR (resting metabolic rate), carbohydrate and daily fat consumption (in g/%). 64 subjects took part in this study, being monitored through the Cosmed Quark CPET device.
Results. Significant differences in carbohydrate consumption and preponderance of this source of energy throughout the day were identified between the studied groups (p=0.014). Also, the metabolic rate and alveolar oxygen tension level influence the whole energy consumption (p=0.005).
Conclusions. The results of this study show a lack of energy metabolism efficiency, directly related to the effort, indicating a level of fatigue among athletes.
Keywords: exercise intensity, energy consumption, athletes, recovery.

Rezumat
Premize. Optimizarea procesului de refacere, din punct de vedere energetic, reprezintă un obiectiv important de studiu pentru îmbunătățirea activității sportive.
Obiective. Acest studiu a urmărit analiza relației dintre activitățile sportive si metabolismul energetic, în procesul de recuperare al sportivului.
Metode. S-a desfășurat un studiu transversal, observațional, în cadrul unui grup sportiv de elită din canotaj, prin monitorizarea ratei metabolice în repaus, a consumului de carbohidrați și de lipide. 64 subiecți au luat parte la acest studiu. Testarea s-a realizat prin intermediul aparaturii Cosmed Quark CPET.
Rezultate. S-au identificat diferențe semnificative privind consumul de carbohidrați între loturile expuse (p=0.014). Totodată, rata metabolică și tensiunea alveolară a oxigenului influențează consumul energetic în repaus (p=0.005), indicând un stadiu de oboseală, pe baza unor valori relevante.
Concluzii. Rezultatele acestui studiu subliniază o lipsă a eficienței metabolismului energetic, în relație directă cu efortul, indicând un stadiu de oboseală între sportivi, pe baza efortului prestat.
Cuvinte cheie: intensitate, consum energetic, sportiv, recuperare.

Introduction

Diet is an important factor influencing the athletes' activity through the energy substrate provided to the body (Beck et al., 2015). Sports activities performed daily in an organized setting entirely influence the specificity and efficiency of the effort performed. However, considering this form of influence, a systematic training program will ensure the athletes' recovery from their daily activity (Seiler et al., 2007). This is possible by respecting the proposed training intensities and the total recovery time between activities (Howatson et al., 2015).

The methods for the recovery of athletes exposed in the literature are widely used in all sports branches (Barnett, 2006). It is certain that nutrition provides through macronutrients, micronutrients and liquids the basis of metabolic body function. The elements referred to are transformed in total energy consumption (energy expenditure of the body) and could be quantified in the total energy consumption of the athlete at rest, adaptable to different periods during a general sports training program.

Through indices represented by O2, CO2, FeO2, PaCO2, PetCO2, PaO2, R (respiratory exchange ratio), used to determine the metabolic rate, different studies have evidenced significant differences during sports activity

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(***, 2001) based on respiratory indices.

The use of a similar system to monitor the data presented is based on the estimation of energy requirements in different periods of the training program. This may indicate the body's energy recovery stage and the action of adaptation to different types of exercise. The data reported are directly proportional to the effort that the athlete most frequently performs (aerobic, alactacid anaerobic, lactacid anaerobic). All data are revised based on the resting metabolic rate and standard values, which under normal circumstances should not be exceeded (e.g. carbohydrate metabolism in female athletes should not exceed 30-40% of energy throughout the day, at rest). However, the combination of these metabolic values (energy consumption, carbohydrate consumption, fat consumption) with blood pH levels may indicate an advanced state of fatigue, based on prolonged periods of the body in specific anaerobic effort (Dolezal et al., 2000). Unlike theoretical information, in practical terms, metabolism is an indicator that cannot indicate a trend for energy metabolism usable in the shortest time. Such data may be processed by biochemical tests, which may indicate the parameters of the body in the most appropriate form.

Hypothesis

The initiation of this study took into account the efficiency of the recovery process of elite athletes after activity. Significant differences in respiratory parameters and energy needs are most often seen in athletes. Furthermore, we believe that correct cyclization of daily sports activity can enhance recovery. Improving daily activity starts properly with the examination of the athletes' physiology, biochemistry, and nutrition. Based on such data, the training program will be implemented.

Materials and methods

Research protocol

The study was conducted after obtaining the approval of the University Ethics Committee and the subjects' informed consent to participate in the study.

a) Period and place of the research

The study was performed on 64 subjects, between 1 June 2015 - 1 July 2015, in Orsova and Bucharest, representing national training centers of elite rowing athletes.

b) Subjects and groups

64 elite rowing athletes representing Romania were included in the study; of these, 30 were male (mean age 19.6 years) and 34 were female (mean age 19.5 years). Male subjects were represented by junior athletes (7 subjects), youth athletes (15 subjects), and senior athletes (7 subjects). Female subjects were represented by junior athletes (15 subjects), youth athletes (8 subjects), and senior athletes (11 subjects).

c) Test applied

Data on resting energy expenditure (kcal), carbohydrate consumption (g%), lipid consumption (g%) were obtained by using the Cosmed Quark CPET device. The tests were conducted in June-July 2015, according to the following protocol: no food ingestion within 5 hours before the test; no sports activity within 24 hours before the test; no caffeine intake for at least 12 hours prior to testing; no consumption of sports supplements containing ephedrine, Ma Huang, pseudoephedrine for the last 12 hours before testing; no nicotine within 12 hours before testing.

d) Statistical processing

Descriptive statistics through the EpiInfo 6.0 test was used in a representative sample. The Chi-square test was chosen to interpret the reported differences in energy metabolism.

Results

We monitored the factors influencing energy requirements and their action on the balance of primary energy sources used during specific activity. The groups of subjects (female-male) were distributed by age and by the category in which they performed (Table I).

Table I

The mean age of the studied subjects.

Group	Senior		Youth		Junior	
	Athletes	Mean age	Athletes	Mean age	Athletes	Mean age
Male	7	22.14	16	19.43	7	17.42
Female	11	22.81	8	20.25	15	16.8

In the case of female athletes (34 subjects), the determined mean value of carbohydrate consumption at rest was 61.09%, equivalent to 298.24 grams, 1222.8 kcal. The mean consumption of lipids was 39.36%, indicating a value of 85.35 grams, equivalent to 776.7 kcal. In the case of the male group (30 subjects), the determined mean value of carbohydrate consumption was 60.56%, equivalent to 395.34 grams, and 1621 kcal. Lipid consumption represented 39.5% of energy consumption, equivalent to 111.37 grams and 1013 kcal.

Among the general groups, we identified no significant differences of total energy consumption at rest (Table II).

Table II

Mean energy consumption at rest male/female.

Group	Senior (kcal)	Youth (kcal)	Junior (kcal)
Male	2570	2707.25	2788.71
Female	2058.54	2046.62	2032.06

No significant results of carbohydrate/lipid consumption at rest (%) between the senior, youth and junior groups (females) were found. However, statistical significance for carbohydrate consumption at rest (p=0.0140) and fat consumption at rest (p=0.0142) was obtained between the youth and the junior group.

In the senior group (22.81 years), we identified statistically significant data between PetO2 representing a reflection of alveolar oxygen tension and total energy expenditure at rest (p = 0.005). Additionally, PetO2 (p = 0.008) and resting energy expenditure (p = 0.0001) were influenced by VO2 (mean value 292.54), which established statistical significance with the body mass index (BMI) (p=0.011). Between lipid and carbohydrate consumption, a direct connection was found (p = 0.0001), while BMI was statistically significant with resting energy expenditure (p = 0.006).

In the male group (seniors), statistical significance was

observed between the value of alveolar oxygen tension (mean PetO2 value 105.04) and the amount of carbon dioxide present in the exhaled air (p = 0.0001). VO2 (mean value 365.80 mL/ min) was related with energy consumption at rest (p = 0.0001), carbohydrate intake at rest, % (p = 0.032) and fat consumption at rest, % (p = 0.031). Additionally, resting energy expenditure was linked with carbohydrate consumption at rest (p = 0.043) and lipid consumption at rest, % (p = 0.0001).

The respiratory exchange ratio (R) was monitored in all the existing groups. As a result, the mean value for the male groups was 0.89 (minimum 0.79; maximum 1.24). The mean value for the female groups was 0.88 (minimum 0.77, maximum 1.07).

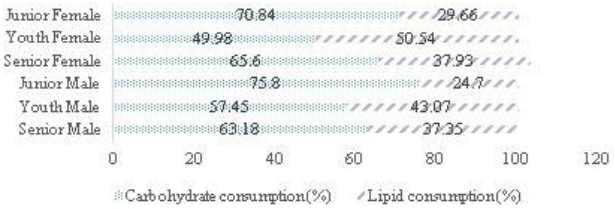

Fig. 1 – Mean monitored value of macronutrient consumption in the studied groups (%).

Regarding the amounts of macronutrients used throughout the day, in direct relation to exercise performance, the percentages of macronutrients monitored, as necessary, after a total rest period of 24 hours, were reported (Fig. 1).

The female youth group established different connections dictated by the work performed and the objectives. $PetO_2$ (p = 0.024) and the amount of carbon dioxide present in the exhaled air (p = 0.033) were related to the respiratory exchange ratio. Resting energy expenditure was significantly correlated with the VO_2 value (p = 0.0001), while the body mass index seemed to influence carbohydrate consumption at rest (p = 0.001), which was in turn related with the consumption of fat at rest, showing a statistically significant difference (p = 0.0001). The data obtained for the male youth group established a clear relationship between the body mass index and resting energy expenditure (p = 0.0460), which was also related with the VO_2 value (p = 0.0001).

In both the female and male junior groups, there were important correlations of alveolar oxygen tension with the amounts of carbon dioxide present in the exhaled air (p = 0.0001; p = 0.004), and in terms of metabolic energy, with carbohydrate consumption at rest (p=0.0001; p=0.004) and lipid consumption at rest (p=0.007; p=0.001).

In terms of total energy consumption at rest, the VO_2 value influenced the final amount of energy required for the junior group (women) through a direct relation (p = 0.0001).

We also mention as potential indicators of the body's reaction after effort: the heart rate value, respiratory rate index (Rf) - mean value for the male group - 12.72; mean value for the female group - 15.36; and alveolar oxygen tension - mean value for the male group - 105.91; mean value for the female group - 109.31.

Discussion

The results were considered over a pre-competitive period of one week of training for the 3 groups (senior, youth, and junior), at five different training intensities (Table III).

Table III
Areas of effort presented in an optimal framework during a week of training.

Effort zone	VO_2 (max%)	HR (max%)	Lactic acid (mmol/L)	Hours per week
R5: zone 1	45-65	55-75	0.8-1.5	1-6
R4: zone 2	66-80	75-85	1.5-2.5	1-3
R3: zone 3	81-87	85-90	2.5-4	50-90 min.
R2: zone 4	88-93	90-95	4-6	30-60 min.
R1: zone 5	94-100	95-100	6-10	15-30 min.

(Beneke et al., 1996; Beneke et al., 2001)

The parameters studied in this paper may represent direct indicators of the adaptation level reported among athletes during specific training periods.

The VO_2 values discussed validate the importance in the production of ATP at mitochondrial level (Bishop et al., 2002). During dynamic effort, heart rate variability decreases even if the respiratory rate and tidal volume increase (Cottin et al., 1999). Moreover, respiratory frequency may impose an increased lactic acid concentration (Kapus et al., 2005), decreased ventilator response during exercise (Kapus et al., 2013), and at the same time it can increase the level of fatigue for the specific efforts with severe oxygen liability by decreasing frequency (Jakovljevic et al., 2009). The metabolic rate is a direct indicator of the effort performed and body recovery, in direct relation with respiratory values. An increased metabolic rate, an increased ventilation can modify the respiratory frequency (Steinacker et al., 1993), a result mentioned in the paper. However, respiratory muscle activity is decreased post-exercise, regardless of the intensity of work, because of the effort performed, suggesting that its subsequent performance can be compromised (Driller et al., 2012). The respiratory exchange ratio (R), as a result of the tests performed, can identify an exclusive consumption of carbohydrates (R≥1 value); exclusive consumption of lipids (value R = 0.7); protein consumption (value R = 0.8) (Ramos-Jiménez et al., 2008). Consequently, the importance of proper periodization of the daily training schedule can be identified, in order to enhance the athletes' recovery period after exercise.

Considering the state of overtraining, indicated by a series of metabolic values, the main description of this state consists of an increased heart rate value, increased energy consumption at rest, mainly an increased metabolic consumption of carbohydrates at rest, loss of appetite and a lack of sports performance. This state is known to reduce the athlete's adaptability during daily training (Kenttä et al., 1998). Thus, in the present study, the percentage of carbohydrate consumption at rest was highlighted, especially in the group of seniors (women). Perceivable differences should be observed in the proportion of lipids to carbohydrates consumed at rest between the two studied groups (male and female) (Wismann et al., 2006)

under normal conditions, with a mixed diet. This aspect is negatively influenced and changed either by a high intake of simple carbohydrates into daily meals, based on the principle according to which macronutrients consumed in excess become the main source of energy at rest (Wim et al., 2003), or through a prolonged period in specific anaerobic effort.

Following exercise performance, it can be seen how the body responds during the recovery process. Using forms of training such as running, frequently found in the case of juniors, is associated with an increased respiratory rate and consequently, with an increased consumption of carbohydrates at rest and a low consumption of fat at rest, indicating an energy imbalance. The individuals of the youth group had a stabilization of the respiratory frequency index, alveolar oxygen tension, and carbon dioxide. Senior athletes experienced significant changes in the main value of the heart rate, resting energy needs and macronutrient consumption preponderance, with a possible association of nutritional imbalances, based on increased energy consumption during prolonged periods in specific anaerobic efforts. The presence of a higher value of the PetO2 index in athletes relying on a high amount of carbohydrates at rest (women's groups) may indicate additional work in the muscle, energy production (Ozcelik et al., 2004) and a decrease in the efficiency of the recovery process.

Conclusions

1. The three groups of athletes included in the study have different forms of training that do not comply with the correct intensity order of the effort during a specific training week (repeating a high intensity effort in less than 24 hours).

2. Additionally, a non-specific activity such as running, without a prior exercise test showing the effort zone in which the athlete should be, is a form of exercise that will induce fatigue and lack of energy substrate, without significant improvements.

3. In this case, the respiratory rate was directly proportional to cellular energy metabolism and alveolar oxygen tension, indicating a prolonged period in which the athlete had an increased heart rate, associated with a mixed anaerobic exercise zone.

4. Restructuring of training, along with individualization of the training process, based on physiological/ biochemical determinations, represent an important point in the process of improving the recovery activity among athletes.

5. The daily nutrition structure must be established based on the period of training.

Conflicts of interest

There are no conflicts of interest regarding the methods, the results and the conclusions drawn.

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Anthropometric indicators in young rugby players
Indicatorii antropometrici la jucătorii de rugby tineri

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Abstract

Background. The current tendencies of modern rugby involve multilateral and specific high level physical training, adapted to the peculiarities of age and level of training.

Aims. The anthropometric indicators in the pre-competition period were studied in young rugby players with specific training and students with general sport training.

Methods. Our research was performed in 6 groups (n=10 subjects/group), 3 control groups CI (18 years), CII (19 years), CIII (20 years) and 3 groups of athletes AIV (18 years), AV (19 years), AVI (20 years). The monitored anthropometric indicators were: weight, height, arm span, palmar flexor strength for both hands and indirectly the body mass index.

Results. Significant increases in weight, body mass index, arm span and palmar flexor strength were found in the athlete groups compared to the non-athlete groups, except for the 18-year-old groups regarding weight. After a one-year period, athletes had significant increases in: weight (the 19-year-old and 20-year-old groups), height (the 18-year-old and 19-year-old groups), body mass index (the 20-year-old group) and arm span (all groups).

Conclusions. The changes in anthropometric characteristics of the rugby players can occur as an adaptive consequence to the specificity of the physical demands of the sport and can be influenced by training.

Keywords: rugby players, anthropometric indicators, physical exercise.

Rezumat

Premize. Tendințele actuale ale rugby-ului modern presupun o pregătire fizică multilaterală și specifică la un nivel ridicat, adaptată particularităților vârstei și nivelului de pregătire.

Obiective. S-au studiat indicatorii antropometrici în perioada de pregătire la jucătorii de rugby cu pregătire specifică și la elevi și studenți cu pregătire sportivă generală.

Metode. Cercetările au fost efectute pe 6 loturi (n=10 subiecți/lot), lotul CI (18 ani), lotul CII (19 ani), lotul CIII (20 ani) martori și lotul AIV (18 ani), lotul AV (19 ani), lotul AVI (20 ani) sportivi. Indicatorii antropometrici studiați au fost: greutatea, înalțimea, anvergura, forța flexorilor palmari pentru ambele mâini și indirect, indicele de masă corporală.

Rezultate. S-au observat creșteri semnificative ale greutății, indicelui de masă corporală, forței flexorilor palmari la loturile de sportivi față de loturile de nesportivi, mai puțin pentru grupul de 18 ani sub aspectul greutății. Pentru loturile de sportivi după o perioadă de un an, au fost observate creșteri semnificative ale: greutății (pentru loturile de 19, 20 ani), înalțimii (pentru loturile de 18, 19 ani), indicelui de masă corporală (pentru lotul de 20 ani), și creșteri ale valorilor anvergurii pentru toate loturile de sportivi.

Concluzii. Modificările indicatorilor antropometrici la sportivii care practică rugby-ul apar ca o consecință adaptativă fața de solicitările fizice specifice acestui sport și pot fi influențate prin antrenament.

Cuvinte cheie: rugbiști, indicatori antropometrici, efort fizic.

Introduction

Rugby is a sport in which anthropometric characteristics play a crucial role in the future development of sportsmen. Unlike many other sports, in rugby the players are in permanent contact with the opponent players, struggling and wrestling to carry the ball into the opposition line or to get in possession of the ball. Due to the high contact nature of this game, every player must be equipped with the necessary skills to deal efficiently with the physical challenge of an opponent, especially when he has the ball in his hands. The high requirements in modern rugby have led to a tendency towards an increase in real gameplay time, with fewer interruptions during the game, demanding the players to be better prepared and able to sustain high intensity efforts repeatedly, with little time to recover.

According to Drăgan's (2002) "biological model" of the player, the positioning of the players in the field is greatly influenced by: height, weight, the height/weight ratio, body composition, muscular development, arm span index and skill level.

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Primary selection in rugby can begin at the age of 7-8 years. Children with good health, good physical development, good coordination, very good speed, combativeness, great courage and passion for the sport should be selected. These considerations should be used as guidelines and must not exclude a highly motivated child with a great desire for this sport, who can compensate through hard training and determination for the lack of some of the above characteristics.

Secondary selection occurs around the age 14. In a study carried out by Sedeaud et al. (2013) on the morphology of French elite rugby players during 2 different seasons 20 years apart, the tendency of the two groups of players (U21 - under 21 years, U15 - under 15 years) was to become "bigger and taller". The U15 backs had gained 5.1 cm in height and 6.5 kg in weight, and the forwards, 4.7 cm and 4.7 kg. This also reflects an early directional selection guideline.

Final selection is intended for players who have acquired well developed physiological and anthropometric qualities, game-specific skill qualities, combined with a wide range of offensive and defensive skills.

In the literature, many authors have studied the anthropometric characteristics of rugby players and their change in time from an early age, at various levels.

Determinations of anthropometric indicators may assist trainers in their pursuit of selecting the best individuals suitable for this sport and distributing them in the field according to their characteristics.

Our data are in accordance with the literature data regarding height for all athlete groups (Gurău, 2002), and weight for the A18 group (Cordun, 2009).

Fontana et al. (2015) studied anthropometric evaluation of professional rugby players. The athletes who took part in the study were players of the Italian national team, first division and second division. Body mass, stature, and body fat percentage were measured. In all three groups of players, the forwards were significantly heavier, taller and had a larger percentage of body fat and fat-free mass than the backs. The higher the lean body mass, the better the competitive level of the players. The data confirm the specificity of physical demands in rugby in different playing positions, at all competitive levels, which must be taken into account when performing selection and establishing training procedures.

In a study carried out by Lombard et al. (2015), following anthropometric determinations in 453 players aged under 20 years old, it was shown that the forwards were significantly heavier (22%), taller (5%) and stronger (18%) than the backs. However, when 1 repetition maximum strength scores were adjusted for body mass, the backs were stronger per kg body mass. Over a 13-year period, there were significant increases in muscular strength (50%), body mass (20%), and muscular endurance (50%). Changes in the physical characteristics of the players over time can occur as a consequence of adaptation to the specificity of the game and different training methods.

Studies carried out by Waldron et al. (2014), involving anthropometric changes in direct relation to performance (under-15 to under-17 age groups) in elite rugby league players, pointed out an increase in lean body mass percentage, which improves sprint time and jumping power. These findings demonstrate the importance of lean body mass gains in later adolescence, supporting the ability to generate horizontal speed and predicted vertical power, which are indispensable in this sport.

Till et al. (2014) tried to evaluate the anthropometric and physical characteristics of English academy rugby league players by annual-age category (under 16s - under 20s) and between backs and forwards. The study showed that anthropometric and physical characteristics develop across annual-age categories and between backs and forwards. The results offer comparative data for such groups and support the need to monitor the players' development and adapt training to their age.

Gabbett et al. (2011) investigated the differences in anthropometrics and skill qualities between the players that were selected in the National Rugby league team and the ones that were not selected. Players selected to play in the first National rugby league game of the season were older, more experienced, leaner, had faster 10 m and 40 m sprint times, superior vertical jump performance and maximal aerobic power compared to non-selected players. The study suggests that selected physiological, anthropometric and skill qualities may influence team selection in the professional rugby league.

A research performed by Fuller et al. (2013) regarding changes in the stature, body mass and age of rugby players in the first team squads of English Premiership rugby union teams from 2002 to 2011 showed that players were generally getting taller, heavier and younger.

A research conducted by Sedaud et al. (2012) indicates, using an anthropometric study, that the teams that most often manage to get to the advanced stages of a competition are the teams which have the heaviest forwards and the tallest backs. From 1987 to 2007, forwards and backs have become heavier by 6.63 and 6.68 kg and taller by 0.61 and 1.09 cm. For all Rugby World Cups, the highest performing teams have the tallest backs and heaviest forwards with the highest percentage of collective experience.

In a study performed by Sedeaud et al. (2013) following anthropometric determinations for French elite rugby players participating in the championship in two different seasons (1988-1989, 2008-2009) and for 145 of the best junior players (under 21), it was found that rugby players had become heavier and taller. This specific morphology is the result of a long process of selection and competition. The study demonstrates that the tendency to "large sizes" is already present at a young age.

A study carried out by Till et al. (2013) on eighty-one junior rugby league players, tracked for a two-year period and measured on three occasions following anthropometric and fitness characteristics, shows an improvement of these characteristics in junior representative rugby players. There is an interactive effect of the playing position and the development of characteristics that occurs during adolescence. The study also demonstrates the need for tracking the progression of characteristics longitudinally during adolescence instead of at one-off time points.

Quarrie et al. (1996) investigated the anthropometric and physical performance characteristics of New Zealand rugby players of different ages and both sexes. The results indicated significant differences between forwards and backs on anthropometric and physical performance variables. In terms of anthropometric characteristics,

forwards of a given grade were generally taller, possessed a higher body mass, and were more endomorphic and less ectomorphic than backs of the same grade. The backs tended to perform better on physical performance measures than forwards, being more aerobically fit, faster, more agile, and possessing a higher degree of muscular endurance. The greater body mass of the forwards allows them to obtain greater momentum when sprinting compared to the backs. The ability to obtain greater momentum is important in the body contact phases of the game. Forwards may compromise their aerobic fitness and speed to some extent in order to maintain a high body mass. The anthropometric and physical performance characteristics of the players appear to reflect the demands placed on them by the sport.

Gabbett et al. (2010) conducted a study that investigated the tackling ability of junior elite and subelite rugby league players, and tried to determine the relationship between selected physiological and anthropometric characteristics and the tackling ability. The results indicated that the strongest individual correlates of an efficient tackling ability were acceleration and lower body muscular power; therefore coaches should emphasize the development of acceleration and lower body muscular power qualities to improve the tackling ability of junior rugby league players.

Morgan et al. (2011) investigated the effects of a preseason training program on the anthropometric characteristics of semiprofessional players. Over the preseason, both backs and forwards reduced fat mass and increased muscle mass. The preseason training program that included testing and feedback, education, and a combination of resistance, speed, and cardiorespiratory training resulted in considerable anthropometric improvements. The study revealed the importance of a periodized preseason training program and its role in assisting players to achieve the desired body composition goals.

In a study carried out by Cheng et al. (2014) in 116 Australian junior elite rugby league players (average age 17 years), height, body mass, eight skinfolds, five girths and two bone breadths were calculated. The results indicated that higher mass, mesomorphy, adiposity and bone size in forwards are desirable for the tackling and attacking ability and may also protect against high impact forces in this position.

Hypothesis

Anthropometric characteristics may significantly contribute to the improvement of selection standards in the case of young rugby players, but they cannot predict individual sports performance in a high proportion, in the long term.

Material and methods

Research protocol

a) Period of research

The research took place in the Ambulatory Sports Medicine Clinic and was approved by its manager and by the Ethics Board of the "Iuliu Hatieganu" University of Medicine and Pharmacy Cluj-Napoca; the informed consent of the subjects was obtained. The determination period was (T_1) April 2013 for groups I, II, III, IV, V, VI, and also (T_2) April 2014 for groups IV, V, VI after training.

b) Subjects and groups

The determinations were performed in 6 groups (n=10 subjects/group);

- 3 control groups CI (18 years "+/- 0.0707"), CII (19 years "+/- 0.0677"), CIII (20 years "+/- 0.0693");
- 3 groups of athletes AIV (18 years "+/- 0.0915"), AV (19 years "+/- 0.0966"), AVI (20 years "+/- 0.0781").

The groups of young professional athletes were members of the "Universitatea Cluj" Club Cluj-Napoca; the control groups were pupils of the "Avram Iancu" High School in Cluj-Napoca and students of the "Babes Bolyai" University in Cluj-Napoca.

c) Tests applied

Anthropometric indicators

- Direct weight (G) in kg measured with a digital scale, height (H) measured in cm using a stadiometer, arm span measured in cm, palmar flexor strength for both the left and right hand measured in kgf with a FA-100 mechanical dynamometer. Indirect determinations – BMI, calculated using the formula G/H^2 (kg/m^2).

d) Statistical processing was performed using Excel application (Microsoft Office 2007) and StatsDirect v2.7.2 software. The results were graphically represented using Excel application (Microsoft Office 2007).

Results

Results are ilustrated in tables I to VIII.

Discussion

Comparative statistical analysis of anthropometric indicators in the studied groups.

The statistical analysis of age values indicated highly statistically significant differences between the following groups: control groups ($p=5.99 \times 10^{-7}$), athlete groups ($p=6.38 \times 10^{-14}$), for paired samples for control groups, between the C18 - C19, C19 - C20 groups ($p<0.001$) and for athlete groups, between the A18 - A19, A19 - A20 groups ($p<0.001$).

Weight (Table I)

The statistical analysis of weight values, considering all groups regardless of the moment of determination, showed highly statistically significant differences for all 18 and 20-year-old groups ($p=5.7x10^{-14}$) and very statistically significant differences for the 19-year-old groups ($p=0.0069$).

The statistical analysis of weight values, considering paired samples (T_1 - T_2 moments), showed:

- statistically significant differences for group A19 ($p<0.05$);
- very statistically significant differences for group A20 ($p<0.01$).

The statistical analysis of weight values for unpaired samples (T_1 - T_2 moments) indicated:

- very statistically significant differences between groups C19 - A19 ($p<0.01$);
- highly statistically significant differences between groups C20 - A20 ($p<0.001$).

Height (Table II)

The statistical analysis of height values considering all 18-year-old groups evidenced statistically significant differences between at least two of the groups ($p=0.0302$).

The statistical analysis of height values, considering paired samples (T_1 - T_2 moments), evidenced very statistically significant differences for groups A18 and A19 ($p<0.01$).

Table I

Comparative analysis of weight values (measured in kg) in the studied groups and statistical significance.

Group	Mean	SE	Median	SD	Min	Max	Statistical significance (p)		
C18	61.9	3.8433	61.25	12.1536	46	84	C18-C19		0.0772
A18 (T1)	82.3	4.4398	81	14.04	62	100	C18-C20		0.4238
A18 (T2)	84.35	3.6553	83	11.5591	70	100.5	C19-C20		0.2686
C19	70.15	1.9279	72	6.0967	58.5	77.5		A18-A19	0.8836
A19 (T1)	83.15	3.6025	83.25	11.3921	68	98	T1	A18-A20	0.2498
A19 (T2)	86.65	4.5802	86	14.4838	68	114		A19-A20	0.2614
C20	65.95	3.106	63.25	9.8219	52	87		A18-A19	0.6996
A20 (T1)	89.6	4.2379	92	13.4015	72	109	T2	A18-A20	0.1242
A20 (T2)	93.55	4.3579	93.5	13.7809	72	113		A19-A20	0.2895
p	C18-C19-C20		C18-A18 (T1 & T2)		T1-T2	S18	C18-A18	T1	0.0027
	0.1822		0.0007			0.2112		T2	0.0005
	A18-A19-A20 (T1)		C19-A19 (T1 & T2)			A19	C19-A19	T1	0.0067
	0.4016		0.0069			0.0393		T2	0.0061
	A18-A19-A20 (T2)		C20-A20 (T1 & T2)			A20	C20-A20	T1	0.0003
	0.2918		5.7×10^{-14}			0.0027		T2	0.0001

Table II

Comparative analysis of height values (measured in cm) in the studied groups and statistical significance.

Group	Mean	SE	Median	SD	Min	Max	Statistical significance (p)		
C18	170.6	2.9822	169	9.4304	157	183	C18-C19		0.1949
A18 (T1)	180.05	2.8621	178.75	9.0506	164	193	C18-C20		0.0807
A18 (T2)	181.2	2.8821	180.5	9.1141	165	195	C19-C20		0.5888
C19	176.7	2.1137	178	6.6841	160	183		A18-A19	0.8431
A19 (T1)	180.7	1.4836	180.5	4.6916	175	191	T1	A18-A20	0.6448
A19 (T2)	181.8	1.5188	182	4.8028	175	192		A19-A20	0.9555
C20	177.3	2.0058	175.5	6.3430	170	191		A18-A19	0.8565
A20 (T1)	182	2.5210	179	7.9722	173	194	T2	A18-A20	0.9561
A20 (T2)	182.6	2.5131	180	7.9470	174	194		A19-A20	0.6712
p	C18-C19-C20		C18-A18 (T1 & T2)		T1-T2	A18	C18-A18	T1	0.0346
	0.2418		0.0302			0.0016		T2	0.0199
	A18-A19-A20 (T1)		C19-A19 (T1 & T2)			S19	C19-A19	T1	0.2853
	0.9303		0.2194			0.0067		T2	0.1129
	A18-A19-A20 (T2)		C20-A20 (T1 & T2)			S20	C20-A20	T1	0.1257
	0.9559		0.1362			0.125		T2	0.0718

Table III

Comparative analysis of BMI values (measured in kg/m^2) in the studied groups and statistical significance.

Group	Mean	SE	Median	SD	Min	Max	Statistical significance (p)		
C18	21.12	0.8788	21.31	2.7790	17.78	27.43	C18-C19		0.1976
A18 (T1)	25.33	1.1153	25.12	3.5268	19.79	30.30	C18-C20		0.7394
A18 (T2)	25.65	0.8022	26.20	2.5369	22.09	29.41	C19-C20		0.0304
C19	22.46	0.4558	22.79	1.4414	20.04	24.62		A18-A19	0.9482
A19 (T1)	25.43	0.9751	24.52	3.0835	21.95	31.28	T1	A18-A20	0.3023
A19 (T2)	26.22	1.3928	24.70	4.4043	21.46	36.39		A19-A20	0.3016
C20	21.04	1.1233	20.63	3.5521	17.18	30.10		A18-A19	0.7301
A20 (T1)	27.03	1.1518	25.98	3.6424	22.22	33.46	T2	A18-A20	0.1174
A20 (T2)	28.05	1.2104	27.39	3.8277	22.22	35.01		A19-A20	0.3326
p	C18-C19-C20		C18-A18 (T1 & T2)		T1-T2	A18	C18-A18	T1	0.0087
	0.0648		0.0031			0.4928		T2	0.0013
	A18-A19-A20 (T1)		C19-A19 (T1 & T2)			A19	C19-A19	T1	0.0163
	0.4691		0.0353			0.1505		T2	0.0264
	A18-A19-A20 (T2)		C20-A20 (T1 & T2)			A20	C20-A20	T1	0.0007
	0.3257		0.0008			0.0134		T2	0.0005

Table IV

Comparative analysis of arm span values (measured in cm) in the studied groups and statistical significance.

Group	Mean	SE	Median	SD	Min	Max	Statistical significance (p)		
C18	172.5	3.1737	174.5	10.036	158	184	C18-C19		0.3429
A18 (T1)	184.8	2.8394	184.5	8.979	168	196	C18-C20		0.4240
A18 (T2)	185.5	2.676	185	8.4623	171	196	C19-C20		0.4688
C19	177.7	2.0169	179.5	6.3779	163	183		A18-A19	0.7817
A19 (T1)	184.8	1.4126	185.5	4.4672	179	190	T1	A18-A20	0.8388
A19 (T2)	185.9	1.402	186.5	4.4335	179	192		A19-A20	0.8958
C20	177.8	2.444	175	7.7287	171	196		A18-A19	0.8965
A20 (T1)	185.6	2.6382	184	8.3427	173	196	T2	A18-A20	0.8753
A20 (T2)	186.1	2.656	184.5	8.3991	173	197		A19-A20	0.9478
p	C18-C19-C20		C18-A18 (T1 & T2)		T1-T2	A18	C18-A18	T1	0.0098
	0.4888		0.0055			0.0445		T2	0.0058
	A18-A19-A20 (T1)		C19-C19 (T1 & T2)			A19	C19-A19	T1	0.0091
	0.9656		0.0064			0.0313		T2	0.0029
	A18-A19-A20 (T2)		C20-A20 (T1 & T2)			A20	C20-A20	T1	0.0345
	0.9829		0.0379			0.015		T2	0.0244

Table V

Comparative analysis of left hand palmar flexor muscle strength (measured in kgf) in the studied groups and statistical significance.

Group	Mean	SE	Median	SD	Min	Max	Statistical significance (p)		
C18	27.8	3.5239	27	11.1435	15	52	C18-C19		0.6966
A18 (T1)	45.2	3.5553	42	11.2428	32	62	C18-C20		0.8604
A18 (T2)	48.2	2.5024	48	7.9134	38	62	C19-C20		0.8156
C19	29.4	1.9333	29	6.1137	18	40		A18-A19	0.3536
A19 (T1)	41.2	2.1949	40	6.941	26	52	T1	A18-A20	0.2788
A19 (T2)	40.7	2.1294	41	6.7338	30	50		A19-A20	0.0240
C20	28.6	2.7657	29	8.7458	18	46		A18-A19	0.0348
A20 (T1)	50.4	2.9933	50	9.4657	40	72	T2	A18-A20	0.4737
A20 (T2)	51	2.8944	49	9.153	38	68		A19-A20	0.0107
p	C18-C19-C20 0.9227		C18-A18 (T1 & T2) 0.0002		T1-T2	S18 0.1934	C18-A18	T1	0.0027
								T2	0.0002
	A18-A19-A20 (T1) 0.1083		C19-A19 (T1 & T2) 0.0005			S19 0.839	C19-A19	T1	0.0008
								T2	0.0010
	A18-A19-A20 (T2) 0.0216		C20-A20 (T1 & T2) 5.61×10^{-6}			S20 0.7866	C20-A20	T1	4.39×10^{-5}
								T2	2.61×10^{-5}

Table VI

Comparative analysis of right hand palmar flexor muscle strength (measured in kgf) in the studied groups and statistical significance.

Group	Mean	SE	Median	SD	Min	Max	Statistical significance (p)		
C18	30.8	3.6264	30	11.4678	12	56	C18-C19		0.3610
A18 (T1)	44.2	3.4183	41	10.8095	30	62	C18-C20		0.4529
A18 (T2)	49	3.5308	46	11.1654	38	74	C19-C20		0.8082
C19	34.4	2.2667	32	7.1678	26	46		A18-A19	0.5022
A19 (T1)	41	3.1868	40	10.0775	30	60	T1	A18-A20	0.4343
A19 (T2)	45.6	3.1805	43	10.0576	30	68		A19-A20	0.1117
C20	35	4.1015	34	12.9701	10	58		A18-A19	0.6401
A20 (T1)	47.4	2.045	46	6.467	40	58	T2	A18-A20	0.4009
A20 (T2)	50.4	2.4909	49	7.8768	42	68		A19-A20	0.2511
p	C18-C19-C20 0.5054		C18-A18 (T1 & T2) 0.0018		T1-T2	S18 0.1953	C18-A18	T1	0.0150
								T2	0.0009
	A18-A19-A20 (T1) 0.3225		C19-A19 (T1 & T2) 0.0419			S19 0.0984	C19-A19	T1	0.1282
								T2	0.0133
	A18-A19-A20 (T2) 0.3364		C20-A20 (T1 & T2) 0.0028			S20 0.1054	C20-A20	T1	0.0180
								T2	0.0059

Table VII

Statistical analysis of correlation between the values of the studied indicators for the control groups.

Indicator \Group		C18		C19		C20	
Weight	Height	0.7645	****	0.7746	****	0.0832	*
	BMI	0.8576	****	0.5447	***	0.8268	****
	Arm span	0.8271	****	0.5896	***	-0.1402	*
Height	BMI	0.3267	**	0.0500	*	-0.5046	***
	Arm span	0.9368	****	0.8636	****	0.9482	****
BMI	Arm span	0.4702	**	-0.1416	*	-0.5289	***
PFMS-LH	PFMS-RH	0.8630	****	0.4738	**	0.5936	***

Legend: BMI = body mass index, PFMS-LH = palmar flexor muscle strength - left hand, PFMS-RH = palmar flexor muscle strength - right hand. Correlation **** very good, *** good, ** acceptable, * weak.

Table VIII

Statistical analysis of correlation between the values of the studied indicators for the athlete groups.

Moment		T1						T2					
Indicator \ Group		A18		A19		A20		A18		A19		A20	
Weight	Height	0.6019	***	0.5207	***	0.3659	**	0.6990	***	0.2481	*	0.3293	**
	BMI	0.7929	****	0.9240	****	0.8091	****	0.6485	***	0.9481	****	0.8042	****
	Arm span	0.6157	***	0.1723	*	0.4705	**	0.7000	***	0.1499	*	0.3950	**
Height	BMI	-0.0072	*	0.1560	*	0.0182	*	-0.0896	*	-0.0714	*	-0.0610	*
	Arm span	0.9559	****	0.6339	***	0.9507	****	0.9451	****	0.6147	***	0.9509	****
BMI	Arm span	0.0523	*	-0.0614	*	-0.1001	*	-0.0241	*	-0.0321	*	-0.1843	*
PFMS-LH	PFMS-RH	0.8536	****	0.8006	****	0.8030	****	0.4118	**	0.6641	***	0.8754	****

Legend: BMI = body mass index, PFMS-LH = palmar flexor muscle strength - left hand, PFMS-RH = palmar flexor muscle strength - right hand. Correlation **** very good, *** good, ** acceptable, * weak.

The statistical analysis of height values considering unpaired samples (T_1 - T_2 moments) showed statistically significant differences between groups C18 - A18 ($p<0.05$).

Body mass index (BMI) (Table III)

The statistical analysis of body mass index "BMI" values showed statistically significant differences between at least two of the groups considering all 18, 19-year-old groups ($p=0.0031$), ($p=0.0353$) and highly statistically significant differences for the 20-year-old groups ($p=0.0008$).

The statistical analysis of BMI values, considering paired samples (T_1 - T_2 moments), evidenced statistically significant differences for the A20 group ($p<0.05$).

The statistical analysis of BMI values for unpaired samples (T_1 - T_2 moments) showed:

- statistically significant differences between groups C19 - A19 ($p<0.05$);
- very statistically significant differences between groups C18 - A18 ($p<0.01$);
- highly statistically significant differences between groups C20 - A20 ($p<0.001$).

Arm span (Table IV)

The statistical analysis of arm span values showed very statistically significant differences between at least two of the groups considering all 18, 19-year-old groups ($p=0.0055$), ($p=0.0064$) and statistically significant differences for the 20-year-old groups ($p=0.0379$).

The statistical analysis of arm span values, considering paired samples (T_1 - T_2 moments), evidenced statistically significant differences for A18, A19, A20 groups ($p<0.05$).

The statistical analysis of arm span values for unpaired samples (T_1 - T_2 moments) showed:

- very statistically significant differences between groups C18 - A18 and C19 - A19 ($p<0.01$);
- statistically significant differences between groups C20 - A20 ($p<0.05$).

Palmar flexor muscle strength

Left hand palmar flexor muscle strength (Table V)

The statistical analysis of left hand palmar flexor muscle strength values indicated highly statistically significant differences between at least two of the groups considering all 18, 19, 20-year-old groups ($p=0.0002$), ($p=0.0005$), ($p=5.61 \times 10^{-6}$).

The statistical analysis of left hand palmar flexor muscle strength values considering all athlete groups at moment T_2 indicated statistically significant differences between at least two of the groups ($p=0.0216$).

The statistical analysis of left hand palmar flexor muscle strength values for unpaired samples at T_1 showed:

- very statistically significant differences between groups C18 - A18 ($p<0.01$);
- statistically significant differences between groups A19 - A20 ($p<0.05$);
- highly statistically significant differences between groups C19 - A19 and C20 - A20 ($p<0.001$).

The statistical analysis of left hand palmar flexor muscle strength values for unpaired samples at T_2 indicated:

- statistically significant differences between groups A18 - A19 and A19 - A20 ($p<0.05$);
- very statistically significant differences between groups C19 - A19 ($p<0.01$);
- highly statistically significant differences between groups C18 - A18 and C20 - A20 ($p<0.001$).

Right hand palmar flexor muscle strength (Table VI)

The statistical analysis of right hand palmar flexor muscle strength values indicated very statistically significant differences between at least two of the groups considering all 18, 20-year-old groups ($p=0.0018$), ($p=0.0028$) and statistically significant differences for the 19-year-old group ($p=0.0419$).

The statistical analysis of right hand palmar flexor muscle strength values considering unpaired samples at moment T_1 indicated statistically significant differences between groups C18 - A18 and C20 - A20 ($p<0.05$).

The statistical analysis of right hand palmar flexor muscle strength values considering unpaired samples at moment T_2 showed:

- statistically significant differences between groups C19 - A19 ($p<0.05$);
- very statistically significant differences between groups C20 - A20 ($p<0.01$);
- highly statistically significant differences between groups C18 - A18 ($p<0.001$).

Conclusions

The following changes were found:

1. Significant increases in weight, body mass index, arm span and palmar flexor strength in the athlete groups compared to the non-athlete groups, except for the 18-year-old groups regarding weight.

2. After a one-year period (at T_2), athletes had significant increases in: weight (the 19-year-old and 20-year-old groups), height (the 18-year-old and 19-year-old groups), body mass index (the 20-year-old group) and arm span (all groups).

3. The changes in anthropometric characteristics of the rugby players can occur as an adaptive consequence to the specificity of the physical demands of the sport and can be influenced by training. These characteristics and the changes that follow in time must be taken into consideration for further athlete selection.

Conflict of interests

Nothing to declare.

Aknowledgements

The paper is based on the results of the first author's doctoral thesis, which is in progress at the "Iuliu Hatieganu" University of Medicine and Pharmacy Cluj-Napoca.

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The effects of patient positioning in wheelchairs on cardiac and metabolic function

Efectele poziţiei pacientului în scaunul cu rotile asupra funcţiei cardiace şi metabolice

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Abstract

Background. Limited information is available on patient wheelchair mobility positioning and the effects on cardio-respiratory function. Proper sitting posture can be a key determinant on a patient's cardio-respiratory function during activity, as physiologic demands can be affected based on the patient's assumed sitting position.

Aims. The study aimed to determine the effects of a solid seat insert and lumbar postural roll on cardiac and metabolic function in patients diagnosed with stroke.

Methods. A total of 7 subjects propelled a wheelchair 300 feet during two separate trials: sitting in a sling wheelchair seat (SWS); and using a solid seat insert with lumbar support (Modified). Data was collected using the Physioflow Cardiograph and Oxycon Mobile Systems at four distinct time points during each trial.

Results. At the end of the trial, cardiac output (SWS: 5.9±0.5 L/min vs. Modified: 6.5±0.8 L/min), ejection fraction (SWS: 57.9±22.9% vs. Modified: 59.3±20.6%), myocardial contractility (SWS: 165.9±112.2 ohm/sec/m2 vs. Modified: 178.7±113.6 ohm/sec/m2), and heart rate (SWS: 90.5±13.6 bpm vs. Modified: 93.5.±15.6 bpm) were higher during the Modified positioning, although not significantly. Oxygen consumption was similar between trials (SWS: 6.7±1.4 mL/kg/min vs. Modified: 7.5±2.5 mL/kg/min).

Conclusions. In subjects diagnosed with stroke, a modified wheelchair sitting posture could create a more beneficial physiological position responsible for enhancing the cardiac function and increasing oxygen utilization, an indicator of cardio-respiratory fitness. Although, the trials were not statistically significant, the depicted trend is the incipient evidence that patients with stroke can benefit from modified wheelchair positioning.

Keywords: wheelchair, positioning, cardiac function.

Rezumat

Premize. Literatura ne oferă puţine informaţii privitoare la poziţia pacienţilor cu handicap în scaunul cu rotile, şi la efectele acesteia asupra funcţiei cardiorespiratorii. Postura adecvată în scaun poate reprezenta un determinant cheie al funcţiei cardio-respiratorii a pacientului în timpul deplasării, dat fiind că cerinţele fiziologice pot fi influenţate de poziţia pe care el o adoptă.

Obiective. Studiul şi-a propus să determine efectele plasării unui suport solid (placă) sub perna scaunului cu rotile şi a unui rulou în zona lombară asupra funcţiei cardiace şi metabolice, la pacienţii cu accident vascular cerebral.

Metode. Un număr de 7 subiecţi au parcurs distanţa de 300 picioare (un picior are 0,3048 m) în două condiţii; într-un scaun cu rotile standard (SRS), respectiv într-unul modificat (SM), prin plasarea unei plăci de lemn sub perna de sub şezut, şi a unui rulou în zona lombară. Datele au fost colectate cu ajutorul cardiografului Physioflow şi al sistemului mobil Oxicon, în patru momente distincte ale testărilor.

Rezultate. La sfârşitul deplasărilor pe distanţa menţionată, debitul cardiac (SRS: 5,9 ± 0,5, faţă de SM: 6,5 ± 0,8 l/min), fracţia de ejecţie (SRS: 57,9 ± 22,9, faţă de SM: 59,3 ± 20,6%), contractilitatea miocardică (SRS: 165,9 ± 112,2, faţă de SM: 178,7 ± 113,6 ohm/sec/m2) şi frecvenţa cardiacă (SRS: 90,5 ± 13,6, faţă de SM: 93,5 ± 15,6 bătăi/min) au fost mai mari, deşi nesemnificativ, atunci când s-a utilizat scaunul modificat. Consumul de oxigen nu a fost influenţat de poziţia pacientului în scaun; SRS: 6,7 ± 1,4, faţă de SM: 7,5 ± 2,5 ml/Kg/min.

Concluzii. La pacienţii cu accident cerebral vascular modificarea poziţiei în scaunul cu rotile ar putea avea efecte fiziologice favorabile, ce ar putea conduce la îmbunătăţirea funcţiei cardiace şi creşterea consumului de oxigen, indicatori de încredere ai capacităţii de efort. Deşi rezultatele noastre nu au evidenţiat modificări semnificative statistic în acest sens, tendinţele constatate pot constitui dovezi incipiente încurajatoare că pacienţii respectivi ar putea beneficia de perfecţionările scaunului cu rotile propuse de noi.

Cuvinte cheie: scaun cu rotile, poziție, funcția cardiacă.

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Introduction

Cerebral Vascular Accidents are one of the leading causes of severe long-term disability in the United States. Each year 795,000 people in the United States experience a new or recurrent stroke (Go et al., 2014). In addition, an estimated seven million Americans older than 20 years of age have had a stroke (Go et al., 2014). Due in part to an aging population and improvements made in cardiac disease identification and treatment, it is likely that there will be an increase in the number of patients diagnosed with stroke in the next 10-20 years (Alberts, 2003).

Many stroke survivors rely on wheelchairs during and after their acute recovery. Wheelchair cushions for patients with stroke are used to facilitate normal posture (In Hee & Sang Young, 2011). The posture of the body and normal spinal curvature are both affected by the seating surface, as pelvic position is a critical and highly influential contributing factor to normal spinal alignment. The thoracic spine, in combination with the rib cage, biomechanically serves as a stable support structure for the heart and lungs (Mauriciene et al., 2009). Through proper body positioning, the thorax has an increase in anatomical space allowing the lungs to expand fully, establishing a clear, fundamental connection between body positioning and effective breathing. The main posture affected by the conventional sling-seated wheelchair is that of excessive thoracic kyphosis, a biomechanical imbalance brought on by prolonged periods of time in one flexed postural position (Price, 2013). Patients of post-stroke status may be positioned in a wheelchair for an extended length of time, which could hinder their cardio-respiratory function. The main responses monitored for change during exercise rehabilitation - even with wheelchair propulsion - are: heart rate, cardiac output and performance of practical functions, all of which affected by the posture of the body (Soo-Young, 2012). Therefore, it is essential for patients to receive proper wheelchair positioning to optimize cardio-respiratory function, furthermore impacting recovery through an increased ability to participate in rehabilitation regimens to promote functional mobility.

Past research has attempted to identify efficient outcome measures in patients of post-stroke status utilizing different seat positioning. These studies focused on functional reach in elderly patients seated in sling wheelchair seats (SWS) versus those in a wheelchair with a solid seat insert (Amos et al., 2001). Limited information is available on patient wheelchair mobility positioning and the effects on cardio-respiratory function. Proper sitting posture can be a key determinant on a patient's cardio-respiratory function during activity, as physiologic demands can be affected based on the patient's assumed sitting position. The present study investigated whether cardio-respiratory function improved in patients of post-stroke status through correction of posture and restoration of proper thorax biomechanics while performing functional wheelchair propulsion.

Hypothesis

We hypothesize that in patients post-stroke, correction of posture and restoration of proper thorax mechanics while performing functional propulsion of the wheelchair will result in improved cardio-respiratory function.

Materials and methods

Research protocol

a) Period and place of research

The subjects were patients at Carilion Roanoke Community Hospital Inpatient Rehabilitation, a facility with physical therapy, occupational therapy and speech-language therapy.

b) Subjects and groups

Three males and four females of post-stroke status, aged 53 to 72 years, volunteered to be in the study. In order to qualify for the study, patients must have had a primary diagnosis of stroke, be over the age of 50, and have a Functional Independence Measure (FIM) score of greater than or equal to five, with locomotion/wheelchair mobility. Individuals were excluded if they did not have proper decision making capacity as noted in the social worker, physician, or other clinician's notes within the medical record. Individuals were also excluded if they had existing co-morbidities including chronic obstructive pulmonary disease, asthma, or congestive heart failure. The study was approved by Carilion's Institutional Review Board and all subjects provided written informed consent.

c) Tests applied

The study was experimental and tested patients from a sample of convenience. Subjects performed two trials of wheelchair propulsion, each trial covering 300 feet in total length. Methods of wheelchair propulsion varied, as patients were allowed to move the wheelchair using upper and lower extremities. During the first trial, patients propelled a wheelchair in a normal sling seat with a wheelchair cushion (Fig. 1a). During the second trial, a solid seat board insert was placed under the wheelchair cushion and a lumbar postural support roll (Modified) was placed at the curvature of the patient's lumbar spine (Fig. 1b). All patients participated in the same testing procedure. Initially, the goal was to test patients in random fashion with the normal seat or the modified one; however, due to variability in the physical functioning of the patients, assistance was not available at the beginning of the testing.

a **b**

Fig. 1 – Sling wheelchair seat compared to modified positioning.

Prior to testing, each patient had the blood pressure and oxygen saturation recorded. The collected variables included oxygen uptake (VO_2), carbon dioxide production (VCO_2), oxygen uptake per kilogram (VO_2/kg), stroke

volume (SV), heart rate (HR), cardiac output (CO), ejection fraction (EF) and myocardial contractility (CTI).

Patients were instructed to propel their wheelchair 150 feet in a straight line down a hallway, while a research team member followed with a cart containing the testing equipment. Upon reaching the 150-foot marker on the floor, the patient performed a turn to the right and propelled their wheelchair 150 feet back to the original starting position. The total distance propelled by each patient was 300 feet. The patient then rested for approximately ten minutes to allow for the blood pressure and oxygen saturation values to return to normal. Nursing employees provided assistance with a brief sit-to-stand transfer to allow a research team member to place the solid seat board insert and lumbar postural roll into the patient's wheelchair. The patient was then instructed to propel the wheelchair in the same manner as the first trial, with the added solid seat insert and lumbar postural roll.

The Physioflow Cardiograph System (Manatec Biomedical, Paris, France) is a non-invasive device used to hemodynamically monitor patients at rest and during motion. The Physioflow Cardiograph System consists of six non-invasive electrodes that are placed on the anterior portion of the patient's chest wall and left anterior-lateral neck. Before placement of the six electrodes, the patient's skin was removed of hair, abraded, and sterilized with an alcohol pad to ensure a good signal. The electrodes were then placed on the patient in the designated areas outlined by the manufacturer. Once a good signal was established via the Physioflow Cardiograph software, the patient was asked to remain still and quiet for approximately 30 seconds to allow for adequate calibration of the system. The PhysioFlow® emits high frequency (75 kHz) and low-amperage (1.8 mA) alternating electrical current on the thorax. This concept and methodology have been validated at rest and at exercise (Charloux et al., 2000), during maximal progressive exercise (Richard et al., 2001) and at rest, in emergency room and intensive care unit trauma patients (Shoemaker et al., 2006). The Physioflow was validated against the direct Fick method. Mean differences between cardiac output (CO) values obtained by the direct Fick method and the Physioflow device are not significantly different during rest (0.04 l/min), submaximal exercise (Charloux et al., 2000) (0.29 l/min), or maximal incremental exercise (Richard et al., 2001) (0.58 l/min). The direct Fick method is highly correlated with the Physioflow during rest (Charloux et al., 2000) ($r = 0.89$, $n = 40$), submaximal exercise (Charloux et al., 2000) ($r = 0.85$, $n = 40$), and maximal exercise (Richard et al., 2001) ($r = 0.94$, $n = 50$). High correlations in the SV ($r = 0.84$) and CO values ($r = 0.98$) between the direct Fick and impedance cardiography methods have been reported during maximal cycling exercise in young, fit men (Teo et al., 1985).

The Oxycon Mobile System (Carefusion; San Diego, California) is a non-invasive device used to measure metabolic values. The Oxycon Mobile System consisted of a flexible facemask (Hans Rudolph, Kansas City, MO) held in place by a head harness, which covered the patient's nose and mouth. The mask was attached to a bidirectional rotary flow and measurement sensor to determine the volume of inspired and expired air. A sample tube running from the mask to the analyzer unit delivered expired air for the determination of oxygen and carbon dioxide content (Rosdahl et al., 2010). The Oxycon Mobile System was calibrated per manufacturer specifications before testing of each patient, and a breath-by-breath analysis was conducted for each wheelchair propulsion trial. The Oxycon Mobile System has been shown to provide reliable and valid measures during activity (Trost et al., 2012). When compared to the Douglas Bag Method, which is the gold standard in gas analysis, the VO_2 and VCO_2 collected with the Oxycon Mobile System were deemed reliable in sedentary, moderately trained, and professionally trained individuals during cycle ergometer testing (Rosdahl et al., 2010; Trost et al., 2012).

d) Statistical processing

Using SPSS version 18 software (IBM; New York, NY), simple descriptive statistics and an analysis of variance procedure were performed to determine differences in the two types of wheelchair seating options. A two way repeated measures ANOVA was performed to determine any differences between the groups at different time points. An alpha level of 0.05 (two-tailed) was used to determine statistically significant data.

Results

Six of the seven patients (age 65±7.4 years, height 167.1±9.9 centimeters, and weight 80.3±24.1 kilograms) were included in the study for data analysis because, in one patient, mask leakage caused abnormal data collection.

Cardiac data

A repeated measures ANOVA revealed no statistically significant differences ($p>0.05$) in cardiac values across time points between the SWS and Modified positions. There were few variables demonstrating a trend towards improvement with the Modified seating position, namely stroke volume, ejection fraction, myocardial contractility, cardiac output and heart rate. The majority of these differences were seen after 300 feet of wheelchair propulsion (Table I).

Table I

Cardiac variable for SWS and Modified positioning at the end of trials.

Indicator	SWS	Modified	p
SV (mL)	69.2±9.2	73.5±14.6	0.5
EF (%)	57.9±22.9	59.3±20.6	0.9
CTI (ohm/sec/m^2)	165.9±112.2	178.7±113.6	0.7
CO (L/min)	5.9±0.5	6.5±0.8	0.1
HR (bpm)	90.5±13.6	93.5±15.6	0.4

Legend: SWS - sling wheelchair seat; SV - stroke volume; EF - ejection fraction; CTI - myocardial contractility; CO - cardiac output; HR - heart rate.

Metabolic data

Repeated measures ANOVA revealed no statistically significant differences ($p>0.05$) in metabolic values across time points between the SWS and Modified. However, oxygen consumption per kilogram of body weight, oxygen consumption, and carbon dioxide production in the Modified seating position demonstrated a trend towards improvement. The majority of these differences were seen after 300 feet of wheelchair propulsion (Table II).

Table II
Metabolic variables for SWS and Modified positioning at the end of trials.

Indicator	SWS	Modified	p
VO_2 (mL/min)	525.3±167.5	567.3±127.3	0.6
VO_2/kg (mL/min/kg)	6.7±1.4	7.5±2.5	0.5
VCO_2 (mL/min)	503.5±104.5	571.5±124.4	0.3

Legend: SWS - sling wheelchair seat; VO_2 - oxygen consumption; VO_2/kg - oxygen consumption per kilogram; VCO_2 - carbon dioxide production.

Discussions

The aim of this study was to investigate whether different wheelchair seating surfaces, SWS vs. Modified, could have an effect on cardio-respiratory function during wheelchair propulsion in patients undergoing rehabilitation following a stroke.

Cardiac findings

Hemodynamic variables were not different based on the type of posture the patients were asked to adopt during wheelchair propulsion. In a study about the spine sagittal curves, Mauriciene et al. (2009) found that thoracic kyphosis was negatively correlated with cardiovascular parameters. In theory, the slumped wheelchair position could be similar to a kyphotic abnormality and references to the literature should allow valid comparisons between the current results and previous published research. Current subjects tested did not experience any difference with seating mainly because of the clinical status and advanced age. Patients of post-stroke status commonly have primary residual neurological deficits and secondary deficits that collectively contribute to low cardiovascular capabilities post-stroke (Jin et al., 2013). In addition, an aged body will cause a decrease in elasticity and compliance of the cardiovascular system, resulting in an increase in resistance of blood being pumped by the myocardium to peripheral systems. The myocardium must work harder to overcome the ensuing resistance to blood flow, potentially causing myocardial hypertrophy, typically of the left ventricle (Stern et al., 2003). The left ventricle becomes inefficient at pumping blood as a result of increased size, which predisposes elderly individuals to a loss of cardiac adaptability at increased workloads.

Looking at specific cardiac variables, no significant differences in heart rate between the two different types of wheelchair seating were found. Mauriciene et al. found no significant differences in heart rate of subjects 15-18 years of age with thoracic kyphosis when compared with similar control subjects (Mauriciene et al., 2009). This finding supports the results of the present study, as thoracic kyphosis may not cause a heart rate change, albeit an older population was tested. Biomechanically, the thoracic spine and rib cage provide a stable support structure for the heart and lungs, thus the heart may not have a direct biomechanical link to thoracic kyphosis as the autonomic nervous system primary controls heart function.

Cardiac output did not change with variations in wheelchair seating surfaces. Fukuda et al. (2012) conducted a study that analyzed cardiac output response to exercise in individuals with Chronic Heart Failure on a lower extremity ergometer that mimicked the action required to mobilize a wheelchair. They found that stroke volume was significantly responsible for cardiac output response due to stroke volume reaching a plateau at the low intensity exercise (Fukuda et al., 2012). Their study did not have participants perform a functional task, but rather a simulated exercise routine based on physical demands similar to those required for wheelchair propulsion with the lower extremities. The present study did not investigate the differences between seating surfaces at peak workload intensities, although it did collect measurements during functional wheelchair propulsion. Different target populations and variations in workload intensities between our study and that of Fukuda et al. may explain why we did not find any significant difference in stroke volume between seating surfaces. Findings in the present study do indicate that stroke volume tends to increase during wheelchair propulsion at 300 feet with the Modified position compared to the SWS. This suggests that the myocardium, specifically the left ventricle, could be more capable of pumping blood to the peripheral system during times of increased workload when erect posture is required.

Huonker et al. (1998) studied the effects of ejection fraction across sedentary individuals with paraplegia, trained individuals with paraplegia, and able-bodied individuals. The study concluded that ejection fraction was not significantly different among the individuals during a wheelchair ergometer exercise test (Huonker et al., 1998). These results coincide with the findings from the current study. Although not statistically significant, ejection fraction and myocardial contractility tended to be higher in the present study immediately after 300 feet of wheelchair Modified position propulsion. In flexed, kyphotic posture, the heart is under the dominance of parasympathetic activity, which will cause a weakened atrial contraction (Tsuchie et al., 2011). The decreased atrial force of contraction could impact the ventricular filling and cause a decrease in contractility via the Frank-Starling mechanism (Shiels & White, 2008). One standard clinical measurement of heart contractility is the ejection fraction, a variable usually expressed as stroke volume divided by end-diastolic volume. Postural adjustments made while seated in a wheelchair have the potential to increase ejection fraction and restore a normal stroke volume.

Metabolic findings

The Modified position tended to show higher values for VO_2, VO_2/kg, and VCO_2, when compared to the SWS. Tsai et al. (2007) investigated changes in respiratory function across three wheelchair types. The study found that there were no significant differences in VO_2 across the wheelchair propulsion types in patients of post-stroke status (Tsai et al., 2007). Similarly, the present study found that VO_2 did not significantly change with modification of seating posture; however, the results did imply that immediately after 300 feet of wheelchair propulsion, VO_2 and VO_2 per kilogram tended to be higher with the Modified seating position. This suggests that patients of post-stroke status that are wheelchair users may benefit from a Modified sitting position to increase oxygen consumption. An increase in oxygen consumption may cause further oxygen saturation to tissues that require oxygenation at

increased workloads, including the myocardium. The Modified position may induce cardiovascular adaptations that could translate into a greater amount of oxygen being circulated in the cardiovascular system, which can be more efficiently delivered to tissues that metabolically and mechanically require it (Trost et al., 2012). With increased oxygen consumption, partial pressure of carbon dioxide in the blood increases as a waste product of normal cellular metabolism. When carbon dioxide (CO_2) is retained in the lungs, respiratory acidosis may ensue and be further exacerbated by CO_2 that cannot be adequately expired during exercise (Smolka et al., 2014). This mechanism is supported by the trended increase in VCO_2 in the Modified seating position found immediately after 300 feet of wheelchair propulsion.

Limitations of the study

Patients were selected from a sample of convenience, and from a single rehab facility in rural southwest Virginia. The sample size was small due to a limited availability of patients during the testing period. Another limitation could be that the baseline spinal curvature was not measured in the SWS or Modified positions. This could provide further information on subject responses to wheelchair modification due to pre-existing spinal curvature abnormalities. Lastly, more definitive differences could have been attained if locomotion had been longer than 300 feet.

Conclusions

1. The current research did not provide significant evidence linking wheelchair seating surfaces and cardio-respiratory function. However, this does not represent a specific, conclusive result and is not meant to suggest differences do not exist between wheelchair seating surfaces, as the present study did find cardiac and metabolic non-statistical differences across certain time points - particularly directly after increased workload demands.

2. Patients of post-stroke status who use a wheelchair as their primary means of mobility may benefit from a Modified position to further enhance cardio-respiratory function.

Conflict of interest

The authors have no conflicts of interest to disclose.

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REVIEWS
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The kidney and exercise
Rinichiul și efortul fizic

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Abstract

The main functions of the kidney are the maintenance of the body homeostasis (the volume of fluids, their osmolarity, the concentration and content of electrolytes, acid-base balance), the excretion of metabolic end-products and foreign substances, the control of blood pressure, the control of erythrocyte mass through the secretion of erythropoietin, and the regulation of body calcium and phosphate balance through the activation of vitamin D.

Several renal functions are modified during exercise, and preexisting renal dysfunction can influence the assessments of exercise capability.

This paper reviews the effects of exercise on renal activity; exercise-induced haematuria, proteinuria, hyponatremia, hypokalemia and acute kidney injury. The correct management of these modifications requires an accurate diagnosis to define the treatment approach and to determine the permissible exercise.

Keywords: kidney, exercise, haematuria, proteinuria, acute kidney injury.

Rezumat

Principalele funcţii ale rinichiului constau în menţinerea homeostaziei corpului (volumul fluidelor, osmolaritatea lor, concentraţia şi conţinutul de electroliţi, menţinerea balanţei acido-bazice), excreţia produşilor finali de metabolism şi a substanţelor străine, controlul presiunii arteriale, controlul masei eritrocitare prin secreţia de eritropoietină şi reglarea balanţei de calciu şi fosfat din organism prin activarea vitaminei D.

În cursul efortului fizic, o serie din funcţiile rinichiului sunt modificate, o disfuncţie renală preexistentă putând să influenţeze capacitatea de efort.

Lucrarea face o revizie a efectelor exerciţiului fizic asupra activităţii renale; asupra hematuriei şi proteinuriei de efort, a hiponatremiei şi hipopotasemiei induse de efort şi a insuficienţei renale acute de efort. Managementul corect al acestor evenimente se bazează pe un diagnostic corect în scopul stabilirii tratamentului corect şi a aprecierii capacităţii de efort la aceşti pacienţi.

Cuvinte cheie: rinichi, efort fizic, hematurie, proteinurie, insuficienţă renală acută.

Functions of the kidney

The kidney is an organ of vital importance that fulfils numerous functions within the body:

1. *The excretory function*: it represents the depuration function required to clean the body from useless substances that are toxic for the body: the final products of metabolism (urea, creatinine, uric acid, ammonia, bile pigments, lipid and carbohydrate residues, etc.), salts (phosphates, bicarbonates and sulphates), electrolytes (Ca, Mg, Na, K, Cl), colouring agents, toxins, drugs, etc.

2. *The homeostatic function*: through the blood clearance function, the kidney maintains the constancy of the internal environment, i.e., it preserves the concentration of electrolytes in the body, the acid-base balance, maintains the plasma blood volume and blood osmotic pressure constant, and preserves the concentration of certain regular plasma constituents (glucose, amino acids and vitamins).

3. *The endocrine function* is achieved through: the secretion of prostaglandins, nitric oxide, endothelins, the synthesis of certain growth factors (insulin-like growth factor IGF-1, epidermal growth factor EGF, the transformed growth factors TGF-β1 and TGF-β2) and the kinin-forming activity.

4. *The metabolic function*: the kidney participates in gluconeogenesis, ammoniagenesis, the production and catabolism of some hormones, the control of phosphocalcic metabolism through calcitriol (1,25-dihydroxyvitamin D3), the catabolism of β2 microglobulin.

5. *The fibrinolytic function*: consists of the synthesis of

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urokinase (at the level of the urinary tract epithelium and vascular endothelium).

6. *The thermoregulation function*: renal thermogenesis is accomplished via the brown adipose tissue surrounding the kidney.

7. *The antioxidant defence function*: normally, throughout the course of metabolic processes in the kidney, extremely toxic oxygen reactive species are formed. The kidney's antioxidant defence capacity is ensured by a series of antioxidant enzymes: superoxide dismutase, catalase and glutathione peroxidase, glutathione transferase, glutathione reductase, and haeme oxygenase (Briggs et al., 2014; Rayner & Schwellnus, 2008; Tache, 2002).

The kidney and homeostasis

Numerous functions of the body may develop optimally as long as the composition and volume of body fluids are maintained within normal values. As such, cardiac output and blood pressure are dependent on the optimal plasma volume, the action of most enzymes depends on a normal pH and a normal concentration of electrolytes, cell membrane potential depends on the concentration of potassium, and membrane excitability depends on calcium concentration (Briggs et al., 2014).

The kidney's main function is to correct disturbances in the volume and composition of the body secondary to: ingestion of fluids and food, metabolism, environmental factors and exercise. In healthy persons, this correction is achieved in a few hours, so that in the long-term the volume and composition of fluids does not differ much from normal values (Briggs et al., 2014; Rayner & Schwellnus, 2008).

Intense and prolonged exercise may induce changes in renal haemodynamics, the excretory function and the release of hormones, with consequences on the body homeostasis. Some of these changes may impact or even limit the performance of athletes (Poortmans & Zambrasky, 2014).

Changes in renal functions during exercise

Renal plasma flow during exercise

A series of studies performed over the years, starting with the study of Barclay et al. from the University of Birmingham in 1947, have demonstrated without a doubt the fact that renal plasma flow decreases during exercise due to the redistribution of circulation preferentially toward the muscles, heart and lungs, in order to ensure maximum physical performance (Poortmans & Zambrasky, 2014).

The reduction in renal plasma flow is directly proportional to the intensity of exercise, i.e., it is greater as the exercise is more intense. This decrease of plasma flow is more pronounced if exercise takes place under conditions of increased heat and humidity, which favour dehydration. Furthermore, the return to normal of renal plasma flow after exercise is slower than the recovery of the arterial pulse and tension (Poortmans & Zambrasky, 2014; Briggs et al., 2014; Rayner & Schwellnus, 2008; Bellinghieri et al., 2008).

The reduction of renal plasma flow leads, on the one hand, to an increase of energy consumption in the renal tubules, due to an increase in the reabsorption of water and sodium for the recovery of intravascular volume (Briggs et al., 2014; Rayner & Schwellnus, 2008; Bellinghieri et al., 2008). On the other hand, the decrease in renal blood flow and pressure in the glomerular capillaries activates renal self-regulation (through the juxtaglomerular apparatus), in order to preserve the glomerular filtration rate (GFR), leading to vasodilatation of the afferent arteriole (mediated by prostaglandins and nitric oxide) and vasoconstriction of the efferent arteriole (mediated by the renin-angiotensin-aldosterone system, RAA). However, this leads to a decrease of the tubular blood flow, especially in the renal medulla, which increases the risk of renal tubular ischemia and acute kidney injury (AKI) during prolonged exercise, especially if associated with dehydration, rhabdomyolysis, and the use of non-steroidal anti-inflammatory drugs (NSAIDs) (Briggs et al., 2014; Turner & Coca, 2014; Rayner & Schwellnus, 2008).

The urinary excretion of water and electrolytes during exercise

Studies have demonstrated that diuresis is reduced during exercise, thus the urine eliminated during exercise is lower in volume, more concentrated and more acid. This happens because the hydroelectrolytic balance needs to be maintained in case of dehydration and seems to be due to the activation of the hypothalamo-pituitary axis during exercise, with the non-osmotic release of vasopressin (ADH) (Poortmans & Zambrasky, 2014; Rayner & Schwellnus, 2008; Bellinghieri et al., 2008). Moreover, it has been demonstrated that there is a linear correlation between the intensity of exercise and plasma ADH levels. The response of ADH secretion during exercise also depends on the duration of exercise, on the degree of hydration, and on the rate of ADH consumption at hepatic and renal level (Kenefick & Cheuvront, 2012; Rayner & Schwellnus, 2008; Bellinghieri et al., 2008).

During exercise, there are also electrolyte changes. Sodium (Na) is an active osmotic electrolyte, the renal excretion of Na playing a major role in the regulation and control of extracellular volume, including that of plasma volume. The renal elimination of Na decreases during intense exercise. The mechanism is complex and incompletely elucidated; it seems to be due to a reduction in the glomerular filtration of Na and to the activation of the renin-angiotensin-aldosterone system (RAA), secondary to exercise, which leads to an increase in the tubular reabsorption of Na (Poortmans & Zambrasky, 2014; Rüst et al., 2012; Rayner & Schwellnus, 2008).

Disturbances in sodium balance are nevertheless rare during exercise and are rather due to changes in water balance (dehydration with hyperNa, water intoxication with hypoNa) (Rayner & Schwellnus, 2008; Rüst et al., 2012; Verbalis, 2014; Dennen & Linas, 2014).

Exercise-related hyponatremia has been described during exercise. This appears due to non-osmotic ADH release (induced by intense and prolonged exercise), associated with water intoxication through an increased intake of fluids. It may be accentuated by the significant loss of salt through perspiration under conditions of heat and increased humidity (Patel et al., 2005; Bellinghieri et al., 2008; Rayner & Schwellnus, 2008). Usually it lacks

symptoms, but some may appear: nausea, vomiting, headaches, drowsiness, confusion, irritability. Severe hyponatremia may lead to cerebral oedema, loss of consciousness, coma and more rarely, even to death (Noakes, 2002; Palmer et al., 2003; Rayner & Schwellnus, 2008; Verbalis, 2014).

The effects of exercise on the urinary excretion of potassium (K) are variable. In well-hydrated persons, no changes in the excretion of K are observed during moderate exercise. During intense and prolonged exercise, there is an increase in the urinary excretion of K, without changes in serum potassium (Rayner & Schwellnus, 2008; Bellinghieri et al., 2008).

For these reasons, the excessive consumption of fluids should be avoided by marathon runners. Such intake should be adapted individually depending on the length of the race and climate conditions, but also on body mass, rate of perspiration and weight before and after exercise (Kenefick & Cheuvront, 2012; Rayner & Schwellnus, 2008; Hsieh, 2004).

Exercise-related proteinuria

Exercise-induced proteinuria was first observed in recruits in 1878 and subsequently, it was described in participants in the Boston marathon in 1899. A series of subsequent studies have demonstrated that proteinuria induced by exercise may also appear after exercise and is reversible (Kohler et al., 2015; Rayner & Schwellnus, 2008).

Its incidence is variable, between 11 and 100% after intense exercise. It seems that its occurrence depends on the intensity and type of exercise more than on its duration (Heathcote et al., 2009; Poortmans et al., 2015; Kohler et al., 2015). In addition, even though initially it was presumed to be more severe in untrained persons, further studies have demonstrated that at the same intensity of exercise, the level of exercise proteinuria is the same (Shavandi et al., 2012; Poortmans et al., 2015; Kohler et al., 2015; Rayner & Schwellnus, 2008).

Proteinuria normally appears 20-30 minutes after the end of exercise and the return to normality is achieved in a few hours, independently of the athlete's degree of dehydration (Poortmans et al., 2015; Poortmans & Zambraski, 2014; Rayner & Schwellnus, 2008).

The mechanism of development of exercise proteinuria is still incompletely elucidated. It has been observed that glomerular type proteinuria (characterized by the loss of medium molecular weight proteins such as albumin) appears following lower intensity exercise compared with tubular type proteinuria (characterized by the loss of low molecular weight proteins such as alpha 1 microglobulin). Intense exercise results in mixed glomerular and tubular proteinuria (characterized by the presence of both medium molecular weight and low molecular weight proteins) (Poortmans et al., 2015; Kohler et al., 2009; Kohler et al. 2015; Jayne & Yiu, 2014).

The factors involved in the development of exercise proteinuria could be:

a) Metabolic acidosis that appears during intense exercise increases the permeability of the glomerular basement membrane and alters its electrical charge. Metabolic acidosis also alters the electrical charge of proteins and favours their loss through urine.

b) The reduction of renal blood flow during exercise through renal vasoconstriction leads to renal hypoxia and an increase in the permeability of the glomerular basement membrane to proteins.

c) It has been demonstrated that prostaglandin inhibitors reduce exercise proteinuria, while angiotensin conversion enzyme inhibitors do not change the values of proteinuria induced by exercise. Nevertheless, it has been found, in mice, that angiotensin II inhibitors reduce exercise proteinuria.

d) Tubular reabsorption is mediated by receptors. They may be oversaturated when glomerular filtration increases, leading to the development of tubular proteinuria.

e) Genetic predisposition (Gündüz et al., 2005; Haraldsson et al., 2008; Rayner & Schwellnus, 2008; Jayne & Yiu, 2014; Kohler et al., 2015).

Clinically, exercise-induced proteiuria is asymptomatic and is randomly detected with dipstick tests.

If proteinuria is detected within 24-48 hours after intense exercise in healthy persons, without being associated with the intake of nephrotoxic drugs (SAIDs), and completely disappears after 24-48 hours, it can be considered benign (Rayner & Schwellnus, 2008).

If it is persistent and/or is associated with haematuria and/or exceeds 1g/day, it requires additional investigation for the diagnosis of a renal or systemic disease (hypertension) and the assessment of exercise ability (Rayner & Schwellnus, 2008).

For these reasons, it is recommended that all athletes undergo a routine dipstick test for proteinuria before exercise, in order to avoid difficulties in interpreting proteinuria possibly occurring after exercise (Hoffmann et al., 2013; Rayner & Schwellnus, 2008).

Exercise-related haematuria

Exercise-related haematuria has been described in association with a great variety of sports, both in trained athletes and in untrained persons (Rayner & Schwellnus, 2008; Luciani et al., 2010). It has been described in sportsmen practicing contact sports (boxing, football, hockey), as well as in sports such as swimming, canoeing, etc. (Rayner & Schwellnus, 2008; Luciani et al., 2010; Lepers et al., 2013).

The incidence of exercise-related haematuria is variable and depends on the type, intensity and duration of exercise (it is more frequent after intense and prolonged exercise): it was 11.4% in athletes and 20-63% in marathon runners (Rayner & Schwellnus, 2008; Luciani et al., 2010; Kohanpour et al., 2012).

The mechanism of occurrence of exercise-related haematuria is incompletely elucidated; several factors seem to be involved, which act at different levels of the renal-urinary system:

1. Renal: ischemia (secondary to the decrease of renal blood flow, especially in the renal papilla, which occurs during intense and prolonged exercise), AKI (acute kidney injury), vascular fragility, trauma (contact sports, falls), nephroptosis (jogging), lithiasis.
2. Ureteral: lithiasis.

3. Vesical: lithiasis, trauma (runners: repeated compression of the anterior wall of the bladder to the posterior wall), infections.

4. Urethral: direct trauma (cyclists, horse riding), lithiasis, infections, cold (Patel et al., 2005; Rayner & Schwellnus, 2008; Luciani et al., 2010; Kohler et al., 2015).

Clinically, it is usually benign and disappears spontaneously after 24 to 48 hours (Rayner & Schwellnus, 2008; Jayne & Yiu, 2014; Kohler et al., 2015).

If haematuria continues after 48 hours and is associated with: colic or flank pain; proteinuria; presence of urinary casts (red cell, white cell, pigmented); positive urine culture; oliguria 12 hours after intense exercise, additional investigations are required in order to exclude a renal disorder (IgA nephropathy that may be asymptomatic but exacerbated by exercise) or a urinary tract disease (Rayner & Schwellnus, 2008; Luciani et al., 2010).

Exercise-related acute kidney injury (AKI)

AKI is the most severe renal complication that may occur after exercise; unrecognized, it can be fatal due to hyperkalemia. The exact incidence is unknown. The risk to develop AKI depends on various factors such as: the type of exercise, the intensity and duration of exercise, the state of hydration, environmental conditions and the use of drugs during exercise (Bellinghieri et al., 2008; Rayner & Schwellnus, 2008; Hiraki et al., 2013).

Exercise-related AKI may be triggered by several conditions such as:

a) Severe *dehydration* determines a severe diminution of renal blood flow, with renal ischemia and acute tubular necrosis (Rayner & Schwellnus, 2008; Waikar et al., 2014; Turner & Coca, 2014).

b) *Hyperthermia* may develop during intense exercise under conditions of excessive heat and humidity, in athletes who are not acclimatized. On the one hand, hyperthermia leads to excessive sweating and dehydration, with a reduction of renal blood flow. On the other hand, hyperthermia may affect a series of organs, especially skeletal muscles, directly and indirectly. It decreases the blood flow in muscles, which leads to ischemia, aggravates physiological rhabdomyolysis and results in the release of myoglobin. In time, it can be associated with intravascular haemolysis, which may lead to the release of haemoglobin (Vega et al., 2006; Rayner & Schwellnus, 2008; Junglee et al., 2013; Waikar et al., 2014; Turner & Coca, 2014).

c) *Myoglobinuria*: skeletal muscle damage (rhabdomyolysis) leads to the release of myoglobin (Mb). This is a globin chain that contains a haeme pigment. In an acid environment (metabolic acidosis and re-assimilation of bicarbonate in the proximal convoluted tubule), globin dissociates from haeme. This has a direct renal toxic effect interfering with tubular transport mechanisms. Myoglobinuria leads to AKI only in association with other factors (intravascular volume depletion, haemoconcentration, renal vasoconstriction, other nephrotoxins) (Rayner & Schwellnus, 2008; Junglee et al., 2013; Turner & Coca, 2014; Kohler et al., 2015).

d) *Haemoglobinuria***:** it has less dramatic effects on the kidneys. Intravascular haemolysis may appear during exercise through direct mechanical trauma on the red blood cells (more severe in case of structural abnormalities) or through hyperthermia. The haemoglobin (Hb) released is less toxic for the kidney because it irreversibly links to haptoglobin, leading to the presence of a molecule larger than Mb, which passes more difficultly through the glomerular filter. Filtered Hb has toxic effects on the renal tubules through the same mechanism as Mb. It may impact on the renal function only in association with other factors (volume depletion, acidosis, arterial hypotension) (Rayner & Schwellnus, 2008; Waikar et al., 2014; Turner & Coca, 2014).

e) *Nephrotoxic drugs*: NSAIDs are used by athletes, especially by marathon runners. These are completely contraindicated because they severely compromise renal function. On the one hand, they inhibit the synthesis of prostaglandins (which are strong vasodilators and protect the renal blood flow) and on the other hand, they may cause acute interstitial allergic nephritis (Rayner & Schwellnus, 2008; McCullough et al., 2011; Waikar et al., 2014).

In order to prevent exercise-related AKI, a few measures must be observed:

- Athletes should consume sufficient fluids during exercise and in the first hours after exercise, especially under conditions of excessive heat and humidity.
- If exercise is performed under conditions of heat and humidity, athletes should acclimatize before exercise.
- Athletes should avoid the consumption of any drugs before exercise (especially no painkillers or NSAIDs 48 hours before exercise) and during exercise.
- Athletes should request medical advice in case of anuria 12 hours after exercise (Rayner & Schwellnus, 2008; Kenefick & Cheuvront, 2012; Junglee et al., 2013).

Conclusions

1. Renal changes that occur during exercise are numerous and have diverse causes.
2. They should be carefully examined and identified.
3. When present, they should be quickly detected in order to determine the therapeutic approach and to assess the athlete's exercise capabilities.

Conflicts of interest

Nothing to declare.

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Hormonal response to physical exercise
Răspunsul hormonal la efortul fizic

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Abstract

Aerobic/anaerobic physical exercise causes a series of stimuli that can induce many biochemical and hormonal changes in the whole body. Hormones are involved in physiological changes produced in the body during exercise. The duration, the intensity and the type of training modulate these hormonal fluctuations. Aging is associated with an alteration of the neuroendocrine system, which leads to a decrease in the sensitivity of endocrine glands to the action of neurohormones and to a reduction in the number, density and affinity of neurohormone receptors. Increased physical activity is accompanied by great energy loss. The imbalance between energy consumption and the much higher energy expenditure results in the activation of adaptive endocrine and neuroendocrine mechanisms of the body to high physical effort. The endocrine profile developed under various physical exercise conditions: acute, high-intensity, prolonged moderate-intensity, prolonged high-intensity exercise or during restitution is dependent on the integrity of the hypothalamic-pituitary-adrenal, hypothalamic-pituitary-gonadal, hypothalamic-pituitary-thyroid axes and on the sympathetic adrenal medullary system, to which other endogenous and environmental factors are added. The increase in the incidence of diseases, including endocrine disorders closely related to physical exercise and to the absence of physical activity, is an area of wide interest and a public health problem.

Keywords: aerobic physical exercise, anaerobic physical exercise, growth hormone, thyroid hormone, reproductive hormones, adrenal hormones

Rezumat

Efortul fizic aerob/anaerob induce numeroase modificări biochimice şi hormonale la nivelul întregului organism. Hormonii interferează cu modificările fiziologice produse în organism în timpul efortului fizic. Durata, intensitatea, tipul de antrenament, modulează aceste fluctuaţii hormonale. Înaintarea în vârstă se asociază cu alterarea sistemului neuroendocrin, ceea ce conduce la scăderea sensibilităţii glandelor endocrine la acţiunea neurohormonilor şi la reducerea numărului, densităţii şi afinităţii receptorilor acestora. Creşterea activităţii fizice se însoţeşte de pierderea mare de energie. Dezechilibrul balanţei între consumul de energie şi cheltuielile energetice mult mai mari induce instalarea unor mecanisme endocrine şi neuroendocrine de adaptare ale organismului la efortul fizic crescut. Profilul endocrin instalat în variate condiţii de efort fizic: acut, intens, prelungit şi moderat, prelungit şi intens, sau în fazele de restituţie, este dependent de integritatea axelor hipotalamo-hipofizo-corticosuprarenal (AHHCSR), hipotalamo-hipofizo-gonadic (AHHG), hipotalamo-hipofizo-tiroidian (AHHT) şi sistemul simpatoadrenal (SSA), la care se adaugă alţi factori endogeni şi ambientali. Creşterea incidenţei unor afecţiuni inclusiv endocrine, strâns legate de efortul fizic şi de lipsa de activitate fizică, constituie un domeniu de larg interes şi o problemă de sănătate publică.

Cuvinte cheie: efortul fizic aerob, efortul fizic anaerob, hormonul somatotrop, cortizolul, hormonul adrenocorticotrop, hormonul tireotrop, triiodotironina, tiroxina, prolactina, catecolaminele.

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Introduction

Physical exercise has an important impact on the whole organism, mediated by the endocrine and neuroendocrine system. Physical activity causes a series of stimuli that can induce a cascade of biochemical and hormonal changes. Over the past years, an increasing number of studies have analyzed the correlations between the endocrine system and physical exercise, as well as the consequences of exercise on the endocrine system (Soria et al., 2015).

The effect of physical exercise on hormonal profile depends on the nature, duration and intensity of exercise. Hormonal response to physical exercise is influenced by many factors that are closely related to hormone secretion: genetic, ethnic/racial, sex (female/male), age, nutrition, environmental, stress, mental factors (Staicu & Tache S, 2011).

The biological hormonal effect is achieved following a cellular response, which depends on hormone concentration, the number and affinity of cell receptors and the genetic characteristics of each cell. At cellular level, hormone actions induce important biochemical changes, membrane transport and protein synthesis changes, and facilitate the activation of messengers (via protein G): cyclic AMP, Ca^{2+}, inositol triphosphate and diacylglycerol (Hackney & Smith-Ryan, 2013).

Hormonal fluctuations secondary to sports activity depend on the type of exercise (aerobic/anaerobic), the intensity, the duration, the frequency of the training sessions, and the degree of physical training (O'Connor, 2007; Lencu, 2015).

The intensity of physical exercise has a particular impact on hormone secretion. Thus, intense exercise is associated with the production of lactic acid, which modulates hormonal profile during effort. High-intensity short-duration physical training is accompanied by an increase in the production of hormones (except for insulin), while moderate-intensity long-duration training causes a decline and an alteration of hormone homeostasis (Borresen & Lambert, 2009). The duration of rest between the sets of exercices of a prolonged (resistance) training session influences hormonal profile after the cessation of training (Meeusen et al., 2013).

Previous studies have demonstrated a direct connection between the aerobic/anaerobic type of exercise and hormone balance.

Aerobic exercise uses oxygen from outside the body, without consuming the body's oxygen reserves. It lasts for a longer time (several hours), the amount of lactic acid produced does not significantly change, and there is no marked fatigue. Benefits include peripheral cell oxygenation and an improvement of the cardiovascular system (the cardiovascular system functions within normal limits, cardiac rhythm changes are almost imperceptible). The most common examples of aerobic exercise are: spinning, treadmill running and swimming.

Anaerobic exercise consumes the body's oxygen reserves. It lasts for a relatively short time, it is performed at a high intensity, and the amount of lactic acid produced is high. Heart rate significantly changes, but returns to normal after the cessation of exercise. Examples of anaerobic exercise: bodybuilding, sprinting.

The increase of physical activity is accompanied by a greater energy loss. The imbalance between energy consumption and the much higher energy expenditure leads to the activation of adaptive endocrine and neuroendocrine mechanisms of the body to increased physical exercise (Madhusmita, 2014). The activation of these mechanisms has consequences on the body and bone composition and on weight.

Changes in the somatotropic hormone (STH/GH) – somatomedin C (insulin-like growth factor 1/ IGF-1) axis during exercise

Somatotropic hormone is a polypeptide hormone consisting of 191 amino acids, which is secreted by the anterior pituitary lobe. Its secretion is regulated by neurogenic, metabolic and hormonal factors (Thorner, 1998). STH has many actions, of which the most significant are metabolic and linear growth effects. Insulin-like growth factors (IGF-1, IGF-2) are protein substances similar in structure to insulin. The major form is IGF-1, primarily produced by the liver, in response to stimulation exerted by the somatotropic hormone. Among the actions of growth factors, the stimulation of bone and cartilage growth is of great importance (Orasan, 2001).

Young women subjected to intense physical exercise had significant changes of the hormones involved in bone metabolism and the maintenance of calcium balance. Physical exercise has beneficial effects on bone mineral density through a mechanism that is incompletely understood. The exercise response of receptors in the bone system is modulated by hormones. Postmenopausal women with osteopenia had a significant increase of somatotropic hormone during exercise. Subsequently, at the cessation of exercise, its levels decreased to an even lower level than the initial baseline value. The same study did not demonstrate a significant IGF-1 fluctuation during exercise (Kemmler et al., 2003).

Other research evidenced a more marked response of the growth hormone during exercise in postmenopausal women under hormone replacement therapy; this can be explained by the implication of estrogen in the modulation of GH secretion during sports activity (Kemmler et al., 2003). Moderate aerobic training is accompanied by a progressive increase in the plasma concentration of most hormones (including GH/STH). Anaerobic training is associated with an abrupt GH response (Peake et al., 2014). Other study demonstrated in athletes running at a progressively increasing speed a 6-fold elevation of somatotropic hormone levels in the warm-up period, with a 20-fold higher value at the end of the race compared to the initial value; 24 hours after exercise, the values were comparable to baseline. So, progressive physical exercise associated with a considerable anaerobic energy production is associated with an increase of GH, which is significant at the end of exercise; values remain high for another hour after cessation of effort, after which they return to normal (Peake et al., 2014).

During anaerobic physical exercise GH levels doubled, while during aerobic training values were even 14 times higher. After the cessation of both types of training, no significant changes in hormone secretion were found (Weltman et al., 2008).

Overweight, although affecting hormonal response to physical activity, does not alter somatotropic hormone secretion. Obesity induces a negative IGF-1 response to physical exercise (Rubin et al., 2015). Insulin-like growth factor 1 is a polypeptide with a role in growth and development processes; at the same time, it is an indicator of fatigue, physical exhaustion and negative energy balance (Nemet et al., 2004; Elloumi et al., 2005; Nindl et al., 2007). Under the conditions of an energy imbalance in the body caused by caloric restriction, physical overtraining or both, IGF-1 bioavailability decreases (Nemet et al., 2004; Gomez-Merino et al., 2004). Short-duration exercise is accompanied by an increase of IGF-1 (Copeland & Heggie, 2008; Nindl et al., 2009; Eliakim & Nemet, 2013), while prolonged training causes a reduction in polypeptide levels (Nemet et al., 2004; Gomez-Merino et al., 2004). Thus, studies performed in postmenopausal vs. premenopausal women subjected to prolonged sports activity demonstrated a diminution of IGF-1 concentration in both studied groups; these values remained low after the cessation of training (Copeland & Vergosa, 2014). Although the implication of female steroid hormones in the modulation of IGF-1 secretion is known (Waters et al., 2003), no differences were found between premenopausal and postmenopausal women (Copeland & Vergosa, 2014).

IGF-1 secretion is modulated through the somatotropic hormone and the energy balance of the body, but it is independent of menstrual status (Waters et al., 2001). In young women performing prolonged physical activity (gymnasts, athletes, dancers, ballerinas), which induces an energy imbalance in the body, low somatomedin C (IGF-1) values were found (Maïmoun et al., 2013).

Under the conditions of an imbalance between energy production and consumption, adaptive neuroendocrine mechanisms are activated in the body, which are accompanied by an increase of STH secretion, concomitantly with a decrease of IGF-1 (Mathusmita, 2014).

Changes in the lactotropic hormone (PRL - prolactin) axis during exercise

Prolactin is a polypeptide hormone composed of 199 amino acids, which is secreted by the lactotroph cells of the anterior pituitary gland; it is characterized by a structural homology (amino acid sequences) to the somatotropic hormone (STH) and the placental lactogenic hormone (hPL), which might explain common aspects of the physiology of these hormones.

Prolactin acts through prolactin receptors; these are situated in the mammary gland, liver, gonads (ovary/testis), prostate. The main action of prolactin is the induction and maintenance of lactation (Thorner et al., 1998).

Prolactin increases during physical exercise, proportionally to the intensity of training. The increase of prolactinemia is explained by a reduction in the levels of dopamine (a prolactin inhibitor) and by the intervention of stress factors (psychological, thermal, physical).

The response of the hypothalamic-pituitary-thyroid axis to physical exercise

Thyroid-stimulating hormone (TSH) belongs to the category of glycoprotein hormones, along with follicle-stimulating hormone (FSH), luteinizing hormone (LH) and human chorionic gonadotropin. TSH has a trophic effect on the thyroid gland and stimulates the synthesis/secretion of thyroid hormones. TSH secretion is regulated through hypothalamic thyroliberin and through feedback mechanisms by thyroid hormones. Thyroid hormones regulate the growth, differentiation and development processes of tissues and organs; they play a role in basal metabolism, in carbohydrate, lipid, protein and vitamin metabolism. Thyroid dysfunctions induce changes in the body which cause an alteration of exercise tolerance; on the other hand, exercise can affect thyroid function, through the activation of neuroendocrine mechanisms, which lead to changes in the thyrotropic axis, with the alteration of hormone homeostasis (Klubo-Gwieydyinska et al., 2013).

The response of thyroid hormones to exercise is controversial.

Some studies demonstrated in male athletes subjected to intense physical exercise for 1 week an alteration of the thyroid function, with the reduction of the hormones triiodothyronine (T_3), tetraiodothyronine (T_4) and TSH, proportionally to the degree of training (Hackney et al., 2012). Subsequently, other research evidenced in militaries exposed to stress caused by physical overtraining, food and sleep deprivation, an alteration of the hypothalamic-pituitary-thyroid system and implicitly, a reduction of T_3, T_4, TSH hormones; similar results were obtained in young female athletes following very high intensity training (Baylor & Hackney, 2003).

Recent research carried out in male athletes demonstrated during anaerobic treatment an increase of free T_4, T_4, TSH, proportional to the intensity of exercise; at the same time, a reduction of T_3, free T_3 explained by a decrease of the T_4 to T_3 conversion rate was shown (Ciloglu et al., 2005). In trained men, the suppression of T_4 to T_3 conversion during high difficulty sports activity was demonstrated.

The response of the hypothalamic-pituitary-adrenal axis to physical exercise

Adrenocorticotropic hormone (ACTH) is a polypeptide hormone consisting of 39 amino acids. Its main biological action is aimed at the adrenocortical gland, where it stimulates the biosynthesis and secretion of adrenocortical hormones. ACTH secretion is regulated through hypothalamic corticoliberin and through negative feedback by cortisol, produced by the adrenocortical gland. Cortisol is a hormone that is indispensable to life, secreted from the fascicular and reticular zones of the adrenocortical gland. Stress, hypoglycemia, hemorrhage and ACTH stimulate cortisol secretion. The biological actions of cortisol include its role in carbohydrate, lipid and protein metabolism, the anti-inflammatory, immunosuppressive, stimulating effect on gastric acid secretion, the tonic effect on the central nervous system. In excess, it diminishes bone mineralization, disturbs bone protein matrix synthesis and inhibits the development of growth cartilage.

Cortisol is a gluconeogenetic hormone, whose levels increase during physical exercise, proportionally to the degree of training (St Pierre & Richard, 2013). The increase of cortisol represents an adaptive mechanism of the body to stress caused by an energy imbalance (Madhusmita, 2014).

Studies performed on groups of young athletes subjected to aerobic and anaerobic physical exercise evidenced an elevation of cortisol levels during effort, more significant in the case of aerobic exercise; after aerobic exercise, cortisol values remained unchanged; the cessation of anaerobic exercise was followed by an increase of cortisolemia (Balsalobre-Fernandez et al., 2014). In contradiction to the previous study, Kemmler demonstrated in postmenopausal women with osteopenia a decrease of cortisol during effort; the values remained low two hours after the completion of training (Kemmler et al., 2003).

Anterior research showed a moderate activation of the hypothalamic-pituitary-adrenal system and mild hypercortisolism in persons with a high degree of physical training; the values were almost similar to those evidenced in patients with depression or nervous anorexia. These changes represent an adaptive mechanism to stress induced by exhausting physical exercise, which may cause an energy imbalance or important psychological changes.

Elite gymnasts have high basal cortisol values and no circadian cortisol fluctuations; this reflects an adaptation of the body to stress induced by intense and prolonged exercise, concomitantly with a negative energy balance (Maïmoun et al., 2013). Regarding ACTH secretion, no significant changes during exercise were found (Madhusmita, 2014).

The response of catecholamine secretion to physical exercise

Catecholamines (adrenaline, noradrenaline) are synthesized by pheochromocytes of the adrenal medulla; adrenaline is produced exclusively by the adrenal medulla; noradrenaline is released by pheochromocytes of the adrenal medulla, as well as by nerve endings. The secretion of adrenal medullary hormones is regulated by sympathetic stimuli. The biological actions of catecholamines are exerted on the heart, metabolism, muscles and the endocrine system. Aerobic/anaerobic physical exercise induces an increase of catecholamine secretion; the response is more marked for noradrenaline during anaerobic training. The alteration of the sympathetic nervous system, with the diminution of catecholamine response, inhibits alpha- and beta-adrenoceptors in the adipose tissue, reduces lipolysis and favors fat storage and obesity. On the other hand, a low-calorie diet favors the positive effect of catecholamines on lipolysis in obese persons. Consequently, it is recommended to combine a hypocaloric diet with physical training to stimulate the mobilization and use of lipids and implicitly, weight loss (Zouhal et al., 2013).

Changes in the hormones of the endocrine pancreas during physical exercise

The main hormones of the endocrine pancreas are insulin, glucagon and somatostatin. Of these, only insulin undergoes obvious changes in relation to physical exercise. For the other hormones, no significant variations during exercise were found. The alteration of insulin levels during exercise is influenced by glycemia and catecholamines. During aerobic physical exercise, glucose levels are unchanged, and noradrenaline and adrenaline depress insulin secretion. During anaerobic exercise, hyperglycemia inhibits the suppressive effect of catecholamines on insulin (Staicu & Tache, 2011).

The response of the hypothalamic-pituitary-gonadal axis to physical exercise

The female gonad secretes estrogens, progestogens and androgens. Their secretion is regulated by the hypothalamic-pituitary system through the follicle-stimulating hormone (FSH) and the luteinizing hormone (LH). The biological effects of the follicle-stimulating hormone in women are follicular development and estrogen hormone secretion; the luteinizing hormone plays a role in the triggering of ovulation, the initiation and maintenance of corpus luteum activity and not least, in the stimulation of androgen hormone synthesis in thecal and luteal cells.

Estrogen hormones have many effects, the most important of which are the stimulating and proliferative effects on the female reproductive system (along with progesterone), and the metabolic, tonic and excitatory effects on the central nervous system.

The predominant hormone of the male is testosterone, its secretion being regulated by gonadotropic hormones (FSH, LH). Among the significant biological effects of gonadotropic hormones, we mention the stimulation of spermatogenesis (through FSH) and the stimulation of testosterone secretion by the testicular Leydig cells (through LH). Testosterone has mainly a direct action on the male genital tract, a metabolic and growth-stimulating action on muscle and bone tissue. Estrogen and testosterone levels increase during both aerobic and anaerobic exercise, without a significant difference between the two types of training (Wojtys et al., 2015; Orvoll, 2016).

Regarding gonadotropic hormones in young female athletes subjected to physical exercise at an increased intensity, an alteration of luteinizing hormone (LH) pulsations, without an obvious change of the follicle-stimulating hormone (FSH), was demonstrated (Mathusmita, 2014).

The increase in the incidence of diseases, including endocrine disorders closely related to physical exercise or more precisely, to the absence of physical activity, is an area of wide interest and a public health problem.

Conclusions

1. Many fundamental studies currently detail the hormonal profile during physical exercise in relation to the degree, the duration of exercise and rest periods in healthy subjects of different age, sex or physiological status, as well as in patients with metabolic syndrome in particular (obesity, diabetes mellitus, dyslipidemia, arterial hypertension).

2. Physical exercise induces common changes as well as individual differences conditioned by psycho-emotional and environmental factors in all endocrine axes – sympathetic-adrenal, HPA, HPG, HPT, STH, parathormone, pancreas, renin-angiotensin-aldosterone or various peptides with a neurotransmitter or neuromodulator role.

3. Clinical studies have identified pathological endocrine aspects induced by different types of physical exercise: amenorrhea and a predisposition to osteoporosis in female athletes under estrogen deficiency conditions, an alteration of the muscle mass through an excess of STH and anabolic steroids.

Conflicts of interest

Nothing to declare.

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The contribution of play fighting to social skills development
Contribuţia jocurilor de luptă la dezvoltarea competenţelor sociale

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Abstract

The theory of evolution and subsequent developments are based on the assumption that the body adapts and evolves by natural selection, under pressure from the physical and the social environment. These adjustments are designed to address issues vital to the survival of the individual and the species. In recent years there have been many studies on different species of mammals that have tried to highlight the "survival value" or adaptive value of play fighting.

Play fighting is a form of behavior in which partners compete with each other to gain an advantage. Behavior during play fighting largely resembles the behavior in a real fight, where partners encounter, push and pull down onto the ground, trying to get into a position whereby to control or to dominate the opponent. In the play, unlike the fight, movements are exaggerated and performed at a lower intensity, muscles being somewhat less tensed, and certain actions that can cause injury to the partner are inhibited or modified, while offensive-defensive roles will be reversed quite frequently.

Play fighting can be considered a type of evolutionary adaptation designed to facilitate those experiences that will shape the cognitive-emotional development necessary for living in social communities. Play fighting during childhood has an important contribution to the development of the neural mechanisms involved in accurate judgments about the self and others, which are designed to lead to success in social interactions.

Keywords: play fighting, social skills, evolutionary adaptation

Rezumat

Teoria evoluţionistă şi dezvoltările ulterioare sunt fondate pe presupunerea că organismul se adaptează şi evoluează, prin selecţie naturală, sub presiunea mediul fizic şi social. Aceste adaptări sunt menite să răspundă unor probleme vitale pentru supravieţuirea individului şi a speciei. În ultimii ani au fost întreprinse numeroase cercetări pe diferite specii de mamifere ce încearcă să evidenţieze „valoarea de supravieţuire" sau valoarea adaptativă a jocurilor de luptă.

Jocul de luptă reprezintă o formă de comportament în care partenerii concurează unul cu celălalt pentru a obţine un avantaj. Comportamentul din timpul jocului de luptă se aseamănă în bună măsură cu comportamentul din lupta reală, în care partenerii se lovesc, se împing şi se doboară pe sol, în încercarea de a ajunge într-o poziţie prin care să-şi controleze sau să-şi domine oponentul. În joc, spre deosebire de luptă, mişcările sunt exagerate şi efectuate la o intensitate mai redusă, musculatura este ceva mai puţin tensionată, anumite acţiuni care pot provoca rănirea partenerului sunt inhibate sau modificate, iar rolurile ofensiv-defensiv vor fi destul de frecvent inversate.

Jocul de luptă poate fi considerat o adaptare de tip evolutiv, concepută pentru a facilita acele experienţe ce vor sta la baza dezvoltării cognitiv-afective necesare traiului în colectivităţi sociale. Jocurile de luptă din perioada copilăriei au o contribuţie importantă la dezvoltarea mecanismelor neuronale implicate în judecăţi acurate cu privire la sine şi la ceilalţi, ce sunt menite să conducă la succes în interacţiunile sociale.

Cuvinte cheie: jocul de luptă, competenţe sociale, adaptare evolutivă.

Introduction

The evolutionary approaches to human or non-human behavior can be fully understood only in relation to (a) the mechanism explaining the mode of production and ontogenetic development of behavior and (b) the adaptive value of behavior and the contribution of these adaptations to increasing inclusive fitness (Tinbergen, 2005; Burghardt, 2005). The first part provides an explanation of how these traits or behaviors create a certain effect, and the second explains why these behaviors were favored during evolution (Confer et al., 2010; Scott-Phillips et al., 2011). The value of adaptive behavior or "survival value" as it was called by Niko Tinbergen concerns the contribution to increasing the chances of survival and reproduction. As shown by Tinbergen (2005), some animals have a number of behaviors that are difficult to understand. These animals perform a series of strange rocking movements that precede the transition from stillness to movement or transition from movement to immobility. Many of the characteristics of these animals are adaptations that help them camouflage in the living environment, and these motions will be adapted

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to the purpose of avoiding capture by predators that require stimulation by movement in order to detect and track the prey (Tinbergen, 2005). The adaptive value of behavior will be derived from the consequences that arise from these manifestations or from the effects produced by the deprivation of experiences that make these changes possible, but it is not always obvious which functions these behaviors serve.

In recent years there have been many studies on different species of mammals that have tried to highlight the functions of play fighting and their role in development. In the case of our species, these manifestations of play were largely neglected (Pellegrini & Smith, 1998), although this form of play best qualifies for the study of behavioral genetic predispositions (Smith, 2010; Burghardt, 2005). On the other hand, play fighting exhibits the greatest similarity in behavior between humans and other species, especially primates (Aldis, 1975; Burghardt, 2005). The findings related to the functions they perform and the effects of deprivation in animals can bring some clarification necessary to understand the importance of play fighting for normal development in childhood and the consequences of educational policies of deterrence significantly manifested in recent years, which otherwise cannot be appreciated.

Play fighting and social skills development

In humans, play fighting develops around the age of two, in the context of parent-child interactions, a short time before the child engages in free interaction with peers. This playful behavior can contribute, around the age of four, approximately 8% of parent-child interactions (Pellegrini & Smith, 1998; Smith, 2010).

Once children enter the preschool years, they open themselves to interaction with persons from outside the family environment and especially, to interaction with peers (Shaffer & Kipp, 2010). At this age, children allocate significant time to exploring certain ideas and experimenting various strategies to be used in obtaining various social benefits (Kostelnik et al., 2012). As children interact with each other, they learn how to approach a large variety of social situations and how to build skills that will ensure a good adaptation to the living conditions in the communities to which they belong. Kostelnik et al. (2012) consider that in order to develop an adequate level of social competences, children need numerous opportunities for engaging in interactions, especially with peers.

Social competences refer to a person's skills and abilities used to get along with others and adapt to the unexpected situations that may occur in a social context. Social skills are closely related to emotional regulation, which is demonstrated by the fact that children who are able to control their emotions will be more successful in social interactions, and are often regarded as Social-Emotional Competence (Rose-Krasnor & Denham, 2009).

Even if we cannot talk about a definition agreed to by all researchers, it can be affirmed that social competences include "all the social, emotional, and cognitive knowledge and skills children need to achieve their goals and to be effective in their interactions with others" (Kostelnik et al., 2012). The most important social, emotional and cognitive skills for children include: approaching others positively; recognizing emotions in themselves and others; showing a capacity to empathize; giving and receiving emotional support; interacting nonverbally with other children using smiles or other behavior; communicating ideas and needs; adjusting behavior to fit varying social situations; showing interest in others; cooperating and helping others; negotiating and compromising with others appropriately; expressing frustration and anger effectively, without escalating disagreements or harming others; reconciling after a conflict, etc. (Kostelnik et al., 2012).

In the preschool years, the principal forms of interactions occur during play, and play fighting and chasing represent between 3% and 5% of the total playing time. After this age, playful behavior can show a very wide variation due in particular to cultural aspects. The peak of these types of play manifestations will occur between the age of 6 and 10, when they can represent between 10% and 17% of the time allocated to play (Smith, 2010; Pellegrini & Smith, 1998; Rubin et al., 2006).

Most researchers that used data from playgrounds and other naturalistic settings where boys and girls played together found considerable gender differences in play fighting, with boys playing more often and rougher than girls (LaFreniere, 2013; Scott & Panksepp, 2003). However, the few studies that group children into the same gender situations found modest differences between boys and girls in overall play behaviors and the frequency of play fighting and chasing (Scott & Panksepp, 2003).

This gender segregation in play arises in humans around the age of 3 years (Smith, 2010) and can be widely observed in natural settings. The preference of boys and girls for companions of the same gender can be largely explained by genetic and cultural differences. Many researchers generally agree that boys are genetically predisposed toward higher levels of anger, aggression and oppositional behavior (Montgomery et al., 2007) and exhibit greater overt competition for resources, territory, skillfulness at tasks, status, and power compared to females (Schneider et al., 2011). During childhood, male interactions consist of more direct physical challenges and rougher forms of play and risk-taking behaviors (LaFreniere, 2013; Schneider et al., 2011). LaFreniere (2013) found that from the perspective of many girls, these sex-typed behaviors are all good reasons to avoid the groups of boys. Even if girls like to engage in play fighting and chasing or participate in combat sports, most females avoid direct physical challenge and prefer to compete through more indirect or subtle means (Schneider et al., 2011).

Some developmental psychologists, such as Hartup (1996) and Maccoby (1998), consider that sex differences in social behavior and peer relationships in childhood reveal that male and female "cultures" appear to differ in many ways (LaFreniere, 2013). Differences in parenting styles or adults' understanding of which types of behaviors are suitable for boys and which are appropriate for girls and differences in peer cultures within sex-segregated peer groups may enhance the development of different interests and skills in boys and girls (Barbu et al., 2011). In many cultures, boys are encouraged by adults to take especially competitive behavior and expect the girls to mostly manifest cooperative behaviors. On the other hand, educators and other professionals involved in education have a tendency to see competition as "something harmful

that can lead to negative consequences for the children's psychosocial development, whereas cooperation is described as competent social behavior that entails many positive consequences" (Schneider et al., 2011). Studies that assess cooperation in play may conclude that girls are more socially precocious than boys, and boys can eventually catch up in the case of normally developing children (Barbu et al., 2011), which is quite normal if we think that girls of this age have a better physical and cognitive development than boys.

In modern societies, there may be a decrease in gender stereotypes among parents and educators with a higher level education and socio-economic status (Smith, 2010). In a very interesting research conducted in United Kingdom and Italy, Carvalho et al. (1990) assessed the children's own perceptions of gender appropriateness for five common playground activities: play fighting, play chasing, real fighting, football, and rope skipping. The authors found a general trend, in both the UK and Italy, for the degree of gender stereotyping to decrease with age. A startling finding was that rough-and-tumble play and football, seen as typically masculine activities, were reported by more and more girls to be "for both equally," which perhaps reflects an increase of opportunities and activities for females in modern societies (Smith, 2010).

Some studies examining the associations between strategies used to access a desired resource and sociometric status have suggested that children that use both competition and cooperation are more popular among their peers (Hawley, 2007; Schneider et al., 2011). In fact, most situations involving social interactions are not clearly defined as competitive or cooperative, and many may in fact contain elements of both competition and cooperation (Schneider et al., 2011). In light of such recent data and conceptual advances, Schneider et al. (2011) argue that "contemporary thinking has shifted toward a more balanced approach in which the socially competent child is seen as one who can shift appropriately between competition and cooperation, rather than someone who always cooperates".

Play fighting represents a form of behavior in which the partners compete with each other in order to obtain an advantage, but this form of behavior also involves a degree of cooperation meant to ensure the continuation of play and reduce the risk of escalation in real fight. This ambiguity present in play fighting provides an opportunity to make subtle judgments in order to determine the course of action and allow participants to adopt a flexible behavior in relation to the partner's status and actions (Pellis et al., 2010; Pellis & Pellis, 2011).

Anthony Pellegrini shows that the most popular children tend to engage in more social play and suggests that the experience gained in play fighting makes them more able to solve social problems (Pellis et al., 2010; Pellis & Pellis, 2011). Brown (1998) shows that people who are deprived of such playing experiences may encounter difficulties in emotion regulation, which may affect the ability to understand the rules of conduct imposed by living in certain social communities and the ability to find workable solutions to stressful life situations they might experience (Mendizza & Pearce, 2003).

Bekoff (2002) believes that during social play, while they are having fun in a relatively safe environment, the protagonists learn those basic rules or patterns of behavior that are acceptable to others, namely how to manage any conflicts that may occur or how roughly they can interact. Laursen & Pursell (2009) ascertain that socially maladapted children have great difficulty in anticipating and avoiding conflicts, mostly due to a lack of capacity to manage conflict constructively. According to these authors, there is considerable evidence linking individual differences, aimed at regulating emotional and social skills, to behavior in conflict.

Thus, it is claimed that some of the features of play fighting raise problems similar to those encountered during interactions with peers and hence to those regarding conflict resolution, and as such playing experience will reflect positively on emotion regulation and social competence (Bekoff, 2002; Pellis & Pellis, 2006). Despite this evidence, or the existence of a close link between play experience and social skills, there is no evidence of a direct or causal relationship between the two. It can be stated that children with social skills are simply more playful or that such skills facilitate the play. To bring some clarification, several researchers have sought to test this relationship, which led to a series of studies that propose different approaches.

Most research focuses on the consequences that occur as a result of deprivation related to gaming experiences. Experiments have been conducted in the laboratory to control the interactions between the partners and the total time length of the play; the research subjects are usually laboratory rats that lend themselves quite well to this type of experiment because they have a relatively short period of growth and development and although the play is frequently musculoskeletal, it occurs primarily in the context of social play, such as pursuit; so, when they meet other rats, the animals will inevitably engage in some play fighting. Therefore, if rats are isolated in the juvenile period, they will be especially deprived of the opportunity to engage in this play fighting (Pellis & Pellis, 2011).

Studies in rats by Einon et al. (1978) show that play fighting is an essential component of social experience during the juvenile period (Pellis & Pellis, 2006; Pellis & Pellis, 2007). During the day, rat pups will engage in play for about one hour. Juvenile rats that were raised in social isolation, but were left in the company of another neighbor for an hour a day, did not show the same weaknesses as mature rats raised in total social isolation. However, when rat pups spent one hour daily in the company of an adult female who rarely engaged in the play, they exhibited the same weaknesses as adult rats raised in total social isolation. Similarly, rats reared with drugged partners who are thus prevented from behaving playfully, will present at maturity the same development abnormalities as rats reared in total social isolation (Pellis & Pellis, 2006; Pellis & Pellis, 2011). These findings show that the development of social relations involves play relations rather than simple social contacts (Pellis & Pellis, 2006; Graham & Burghardt, 2010).

Depriving rats of opportunities to engage in play with peers in a critical period of development may cause some permanent social deficits regardless of later social stimulation, and can have a major impact on the number and quality of social interactions in adulthood (van den Berg et al., 2004).

Van den Berg et al. (1999), after a series of tests on rats reared in groups or in isolation, show that this form of social play can be indispensable for the development of coping mechanisms that will deal with stressful situations in the social environment. The two groups of rats, after being subjected to strong social stress by being placed in a cage with a dominant male, will present significant differences in the response behavior. The rats reared in isolation, when faced with this form of territorial aggression, have an exploratory behavior causing the resident male to attack, unlike those in the control group, which reduce their activity or remain immobile for a long period of time. In addition, rats reared in isolation require a significantly longer time to adopt a submissive behavior, which may lead to a higher number of attacks. On the other hand, the confrontation with the male resident causes an increase in plasma levels of corticosterone, adrenaline and noradrenaline, and adrenaline and corticosterone concentration levels are significantly higher in the group of rats reared in isolation. By comparing the results regarding behavior and the data derived from the analysis of hormone deprivation, it can be found that playing in the juvenile period does not reduce the impact of the resident male's presence, but rather causes an ability to choose appropriate response strategies (van den Berg et al., 1999). Furthermore, when rats reared in groups are given the chance to escape the dominant male's presence through access to a platform located above, they will seize this opportunity, while rats reared in isolation fail to do so (Pellis & Pellis, 2011). After removal of the dominant male, rats reared in groups, but not those raised in isolation, return to play or mutual care activities that are known to reduce the effects of stress. These differences in behavior between the two groups are highlighted by hormonal changes. In rats reared in groups, the level of corticosterone can increase rapidly under stressful conditions, but will dissipate just as rapidly compared to rats reared in isolation, in which it remains elevated for a longer time period (van den Berg et al., 1999; Pellis & Pellis, 2006).

Similarly, rats reared in a home with a partner, but separated by a wire mesh that allows contacts, sniffing, and even mutual cleaning, will not be able to compensate these social deficiencies later (Pellis & Pellis, 2006). Pellis et al. (2007) observed that these rats, even if they manage to achieve all these socially relevant behaviors, will find it difficult to coordinate their movements with those of their partner. Other researchers have noted that rats reared in isolation fail to adjust the intensity of response to the behavior of their partners or are unable to control the stress generated by the contact with these (Pellis et al., 2005). This inability to coordinate movements and adapt to the partner is a type of defect that appears to be specific to rats reared in isolation, which did not have enough opportunities to engage in play fighting with congeners (Pellis & Pellis, 2007).

The importance of play fighting for social skills development will be emphasized by the finding that it takes a relatively short time period for the lack of playing opportunities to affect the development of social skills and a much longer time period of isolation for other cognitive skills to be affected (van den Berg et al., 2004; Bell et al., 2010; Pellis & Pellis, 2011). Therefore, the absence of adequate social experiences and the lack of opportunities to play may not only affect the neurological development of the individual, but may have persistent effects despite further attempts of rehabilitation (Baarendse et al., 2013; van Kerkhof, 2012).

The expression of a complex behavior, such as playing, involves a wide range of neuronal circuitry. However, more and more researchers have come to see play fighting as a vehicle that brings a strong influence in the region of the prefrontal cortex (PFC) and amygdala, because in these regions some of the most profound neuronal transformations during the juvenile period and adolescence occur (Bell et al., 2010; Pellis et al., 2010; Pellis & Pellis, 2011; van Kerkhof, 2012; Baarendse et al., 2013). Surgical removal of the cortex shortly after birth does not prevent rat pups from engaging in play (Panksepp, 1998) and will not affect the expression of those behavior patterns that make up the different sequences of play, which means that the play will be an expression of some subcortical nervous systems (Pellis et al., 2010). However, numerous studies looking at the effects of cerebral substance damage on behavior reveal that these rats fail to modulate their behavior during development and that they fail to adapt their behavior to the peculiarities of gender or social status of the partner (Bell et al., 2010; Siviy & Panksepp, 2011), deficiencies that are comparable to those of rats raised in social isolation (Pellis & Pellis, 2011). Moreover, a restriction of cortical damage to the prefrontal cortex (PFC) seems sufficient to produce the same deficiencies in social behavior as if rats were deprived of gaming experiences with others (Bell et al., 2010; Pellis & Pellis, 2011).

In an experiment where the main interest was related to neural changes that occur under the influence of different growth conditions (i.e., with an adult female, with a neighbor or with three other fellows), Bell et al. (2010) show that the various different gaming experiences will influence neural development in the orbitofrontal cortex (OFC) and the medial prefrontal cortex (mPFC). The orbitofrontal cortex (OFC) will mainly be affected by the experience with multiple partners and does not seem to be influenced by the content of interactions between partners. The operation of the orbitofrontal cortex (OFC) was associated with the ability to distinguish between different play partners by the fact that rats that were deprived of opportunities to play, or have suffered damage of the OFC, have their own difficulties in identifying partners. In contrast, the medial prefrontal cortex (mPFC) will be modified depending on the type of interactions in which they engage. Animals reared together with adults show the same neural morphology as animals reared in isolation or with drugged partners. The operation of the medial prefrontal cortex (mPFC) was related to proper sequencing and coordination of movements with the response of the partner, which in time will lead to the diversification and refining of behavior. This finding is supported by the finding that rats who suffered injuries to the mPFC will use less complex defensive strategies than their normal peers in the course of playing (Bell et al., 2010).

These studies suggest that different regions of the prefrontal cortex fulfill distinct functions in relation to social behavior, but this does not exclude the fact that these functions serve a broader context of information processing and decision making, the so-called executive functions.

Given the complexity and unpredictability of social interactions, it is possible that these regions may have a clear contribution to shaping behavior according to previous experiences and some indices of the social environment (van Kerkhof, 2012; Bault et al., 2011; Coricelli & Nagel, 2009). Recent neuroimaging research showed that the medial prefrontal cortex (mPFC) is involved in this vast mentalizing neural network, designed to produce successful behaviors in social interactions (Coricelli & Nagel, 2009; Bault et al., 2011). The activity of the mPFC and the other structures that make up this network is linked to the calculation of the error for the expected behavior of others, the uncertainty in the strategy of the others and to strategic thinking in competition with others (Bault et al., 2011; Coricelli & Nagel, 2009). The orbitofrontal cortex (OFC) appears to be involved in evaluating social information, and OFC damage or manipulation of this information may lead to changes in the expression of aggressive behavior (van Kerkhof, 2012). Kerkhof (2012) found that during social play neural activity in the medial prefrontal cortex and orbitofrontal cortex is correlated with activity in the amygdala.

The amygdalian nucleus or "amygdala" is a subcortical neuronal structure located in the medial temporal lobe of each hemisphere (Kolb & Whishaw, 2009), involved in assigning emotional value to milestones and social or environmental events (Trezza et al., 2012; Sander et al., 2003). The better known role of the amygdala is the amplification or modulation of negative emotional states (anxiety and aggression), but the implication of this structure in modulating the expression of positive emotional states becomes increasingly clear (Sander et al., 2003; van Kerkhof, 2012). This is also confirmed by the finding that an impaired amygdala leaves the individual with no response to the emotional significance of an event (Kolb & Whishaw, 2009).

Comparative studies have shown a close correlation between the prevalence of social play and the size of the amygdala, meaning that species that spend more time playing will have a larger amygdala (Pellis et al., 2010). In addition, amygdala lesions are associated with a reduction in play-related manifestations (van Kerkhof, 2012; Pellis et al., 2010). The role of the amygdala in the modulation or expression of playful behavior, although not well-known, is probably achieved through the positive emotional value of playing (Siviy & Panksepp, 2011). Recently it was shown that the amygdala is the neural region where endocannabinoids induce a growth in play manifestations (Trezza et al., 2012), but methylphenidate (Ritalin), a substance that reduces neural activity in the amygdala, also has an adverse effect (van Kerkhof, 2012). Interestingly, the same substance – methylphenidate, may cause an increase in motivation for playing, but this effect will be dependent on dopamine (van Kerkhof, 2012). Additionally, methylphenidate administered locally in the amygdala facilitates learning induced by an "evidence-reward" paradigm, which suggests an increase in sensitivity to relevant cues in the environment (Tye et al., 2010). Tye et al. (2010) provide extensive evidence that dopamine plays an important role in the formation of both appetitive and aversive associations, and identify a potential mechanism by which the increase of dopamine in the amygdala modulates synaptic plasticity.

Through the role it plays in assessing emotionally relevant cues, it can be assumed that the amygdala is involved in establishing the neural architecture in the frontal cortex. In this way, play fighting makes an important contribution to shaping the nervous structures involved in decision making in social interactions (Baarendse et al., 2013) and lays the foundation for those manifestations of reciprocity in social relations (Pellis et al., 2010). Based on these findings, it can be said that during social play, these regions of the frontal cortex are involved in processing information relating to the partners and their behavior, the development of assessments regarding the value of the interaction and selection of an appropriate behavioral response (van Kerkhof, 2012; Bault et al., 2011).

Conclusions

1. Play fighting can be considered an evolutionary adaptation designed to facilitate those experiences that will shape the cognitive and emotional development necessary for living in social communities. Childhood play fighting is undoubtedly among the most important contributors to the development of the neural mechanisms involved in accurate judgments about the self and others, aimed at successful social interactions**.**

2. Play fighting during childhood is the ideal situation for learning about interpersonal relationships and for finding the appropriate balance between competition and cooperation that enables maintaining good social relations. Play fighting may allow finding and experimenting different strategies in order to gain access to resources and achieve a high social status.

3. Educational policies meant to discourage play fighting, manifested more significantly in recent years, come in contradiction with the results of an increasing number of pieces of research. Therefore, a change of strategy is required, at least at the level of preschool and primary education, by ensuring numerous opportunities for engaging in play, especially during breaks and during activities of an unstructured nature. Play fighting during this period can bring other benefits: it ensures an environment for a vigorous level of physical activity and engenders a highly contagious joyful disposition.

Conflicts of interest

Nothing to declare.

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Horia Pop - Fifty years serving Romanian female basketball
Horia Pop - Cincizeci de ani în slujba baschetului feminin românesc

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Abstract

The authors, on the eve of the fiftieth anniversary of Horia Pop's professional activity, wish to pay homage in an article that reviews the defining moments of this exceptional figure's basketball career in the city of Cluj-Napoca, and the track record of the teams coached by him throughout the years.

The first part of this writing is dedicated to his early professional development. Next, a list of achievements of Horia Pop's coached teams in children and junior domestic basketball competitions is presented, as well as his contribution to training the Universitatea Cluj-Napoca female basketball team as either a secondary coach, main coach or technical director, and the team's results in the national championships and the European Champions Cup. He was responsible for numerous wins of the Romanian female basketball players, as a coach for the cadets and junior national representatives. As a token of appreciation for his longstanding activity and prestigious accomplishments, he was awarded the title of honorary coach. Finally, his academic didactic activity is presented.

Keywords: coach, female basketball, Cluj-Napoca.

Rezumat

Autorii, în preajma aniversării a cincizeci de ani de la debutul activității profesionale a lui Horia Pop, au realizat un articol omagial, care trece în revistă principalele momente din activitatea acestui specialist de excepție al baschetului clujean, precum și rezultatele obținute de echipele pregătite de el de-a lungul anilor.

În prima parte, lucrarea se referă la formarea sa profesională inițială. În continuare, sunt prezentate realizările echipelor antrenate de Horia Pop în competițiile naționale de baschet pentru copii și junioare, contribuția sa la pregătirea echipei feminine Universitatea Cluj-Napoca ca antrenor secund, antrenor principal sau director tehnic, rezultatele acesteia în campionatul național, Cupa Campionilor Europeni. De asemenea, ca antrenor al loturilor naționale de cadete și junioare a fost artizanul a numeroase succese ale tinerelor baschetbaliste din România. Ca o apreciere a îndelungatei sale activități, a rezultatelor de prestigiu obținute, a fost distins cu titlul de antrenor emerit. În final, este prezentată activitatea sa didactică universitară.

Cuvinte cheie: antrenor, baschet feminin, Cluj-Napoca.

Introduction

Cluj-Napoca is one of the Romanian cities with a rich economic, cultural, scientific, artistic and sports activity. Sports, considering the achieved performance and the popularity they garner, represent one of the major fields of activity that help promote the city both nationally and internationally. Basketball is one of the most popular sports. Following the results attained by the Universitatea Cluj-Napoca team between 1981 and 1993, Cluj-Napoca was rightly considered the Romanian capital of female basketball. (Cacoveanu, 1991; Radu et al., 1993)

Not many people know, except for insiders of this sport, that the Viitorul School Sports Club teams, through the results obtained in junior I championships, national junior II, junior III, and minibasketball contests, dominated over the years juvenile female basketball in Romania. The principal designer of this success was the honorary coach Horia Pop. Now, on the eve of the anniversary of half a century since he began his work in the service of female basketball in Cluj-Napoca, we deem fit to illustrate the exceptional career of this emblematic expert in this particular field of sport.

Childhood and initial professional training

Horia Pop was born to a family of intellectuals, with strong connections to physical activities, which influenced his entire childhood and then his years as a pupil and a student. He was raised in a sport specific environment. Ever since his middle school years, the dynamics of life channeled his interest towards basketball.

Following his baccalaureate exam, he attended the

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Sports and Physical Education Faculty of the three-year Pedagogical Institute in Cluj-Napoca. He combined the curricular activities required by that higher education institution, which he took very seriously, with performance sport practice, as a member of the Știința Cluj basketball team, having teammates such as Horia Demian, Mihai Albu, Matei Rühring, Imre Vizi (Bodea et. al, 2009).

During his college years, aspiring to become a good professional, constantly striving to improve himself, he aimed to be diligent, to learn and acquire as much knowledge as possible in order to become a physical education teacher. Of great use in the coaching profession, practical and theoretical specialization classes, sports training theory and methodology, physiology of physical exercise, sports psychology and other courses helped him understand the mechanism behind the movement gestures learning process, the function and interaction of training factors in preparing and managing a team, the effects of exercise on the athletes' bodies and their role in achieving performance. He accomplished his initial professional training at the Bucharest Institute of Physical Education and Sports, from which he graduated in 1970.

Over three decades of remarkable results in domestic basketball competitions for children and juniors

After graduation, the coaching career option followed naturally, taking into account his experience as a basketball player, the level of competence attained in college and the fact that a lot of his personality traits were formed in a performance driven environment. He was appointed in the city of Satu Mare and one year later, he transferred to the Cluj-Napoca Sports School for Students.

In exercising his profession, he did not look for a convenient working situation and instant, momentary gratification. He enthusiastically started his coaching career, proving special skills for this line of work, demonstrating a great work capacity. With an extensive experience as a player, he quickly adapted to performance rigors. At first glance, his professional activity followed a regular course, without standing out excessively from that of his colleagues of the same generation.

However, when considering it in terms of achievements, one can understand what it means to have a calling, to show professional dedication, to make a difference in one's job, to leave behind a valuable and long-lasting work legacy, to enjoy the appreciation and recognition of colleagues, sportsmen, members of the basketball family and of the community alike.

Displaying ambition, tenacity, professionalism, he put his knowledge and capabilities to good use, starting with the first generation of players he worked with, completing good selection and training, which facilitated the results that propelled him, in only a few years, alongside coaches such as Gheorghe Roșu, Viorica Bot, Gheorghe Benone, among the specialists with the best results at junior team level of that time (Albulescu, 1981).

A first exceptional outcome was the School Sports Club Cluj-Napoca team's win of the gold medal in the 1971 edition of the Junior II Republican Contest (***, 1971). The following year, the team composed of Luci Cobârzan, Mariana Merca, Irina Szekely, Liana Jichișan, Viorica Moraru, Veronica Potora, Hajnal Horvat, Maria Perde, Eva Zsoldos and Marilena Covaci became a national junior I champion, thus rewarding more than six years of hard work (Radu, 1993).

(Merca-Bagiu, 1966-1985)

Fig. 1 – The players of the School Sports Club Cluj-Napoca team, winner of the 1st place in the 1972 Junior I Republican Championships. Back row: Veronica Potora, Hajnal Horvát, Viorica Moraru, Horia Pop, Éva Zsoldos, Marilena Covaci, Liana Jichișan; Front row: Maria Perde, Irina Szekely, Luci Cobîrzan, Mariana Merca.

Even if he already had experience, gained during the years when he proved himself to be a valuable and skilled coach, and he tried to make the generational leap relying on players with basketball skills, work orientation and performance drive, going to great lengths and training them to the best of his ability, in the end, Horia Pop's second generation team only partially confirmed the expectations. The official competitions won were the National Minibasketball Criterion, in 1977, and the Junior III Republican Contest, in 1979 (Radu, 1992). Moreover, none of the players in this generation managed to establish themselves in a senior first division team.

The real fulfillment of his work as a trainer at junior level came in the period 1981-1987, when teams under his leadership ranked first eight times and won top places on many other occasions in minibasketball, junior III, cadets and junior I competitions (Radu, 1993a).

Table I

Ranking of the Viitorul School Sports Club Cluj-Napoca female basketball team in minibasketball, junior III, cadets, and junior I competitions, between 1979-1987.

Year	Competition level	Place of the match	Ranking position
1979	Minibasketball II	Tulcea	VII
1980	Minibasketball I	Târgoviște	IX
1981	Minibasketball I	Târgu-Mureș	I
1982	Junior III	Constanța	II
1983	Junior III	Focșani	I
1983	Junior II	Târgu-Mureș	I
1983	Junior I	Cluj-Napoca	III
1984	Junior II	Arad	I
1984	Junior I	București	III
1985	Junior II	Tulcea	I
1985	Junior I	Constanța	I
1986	Junior I	Timișoara	I
1987	Junior I	Oradea	I

(Cacoveanu, 1991; Dragoș, 1987)

Over the years, Horia Pop proved himself as a trainer with a good knowledge of his players, who in time got to feel their game disposition, state of mind and had the capacity to maximize their potential for their own and the team's benefit. Although he was known to be exacting throughout his whole career, and some even considered him harsh, most of his players, who are not few, esteem, respect and appreciate him for the way in which he guided their steps, for all they learned from him, the basketball and life lessons taught, for everything they accomplished thanks to him.

Contributions to the Universitatea Cluj-Napoca female basketball team's top performances

Starting with the summer of 1985, training of the Universitatea Cluj-Napoca female basketball team was assigned to Nicolae Martin, main coach, and Horia Pop, secondary coach. Thus, fate made it possible for these two valuable specialists to work together for several years. Apparently, they were incompatible. Having different character traits, their principles concerning the training and management of the team, their opinions and behavior regarding interactions inside the group contrasted. Despite all these differences, like true professionals, they realized that they had common goals – training of the team, achievement of the objectives in the internal championship, and participation of Universitatea Cluj-Napoca in international interclub competitions. During their six years of collaboration, they complemented one another, each offering valuable expertise, which led to the competent training and management of the team, to the winning of six national championship titles (Stănculescu & Iovan, 1986; Stănculescu, 1987; Stănculescu, 1988b; Iovan, 1989; Stănculescu, 1990b; Stănculescu, 1991) and to important international results.

In the fall of 1991, at the time when Nicolae Martin started facing serious health problems, which prevented him from continuing his coaching activity, Horia Pop proved to be providential for the team. Due to his extensive experience as a secondary coach, his good knowledge of the players, his long-lasting and productive collaboration and good personal and professional relationship with Nicolae Martin, taking over the team as the main coach came naturally, with no incidents. So, the team continued its winning streak at national level, with another two gold medals, in 1992 (Radu, 1992b) and in 1993 (Radu, 1993a).

Given that after 1993 organizational issues and financial difficulties arose, Horia Pop continued his work as either a main coach or a technical director. Even though championship titles were no longer won, the team still remained, for a few years, among the top ones of the domestic championship. In the 1993/1994, 1994/1995 and 1995/1996 seasons, the female players trained by Horia Pop and Elena Popescu won the silver medal in the national championship (Bodea et al., 2009).

In the autumn of 1996, Horia Pop gave up his role as a coach of the Universitatea Sports Club, decision which later turned out not to be definitive. For a brief period of time, he returned as the technical director of the academic team, collaborating with Simona Mușat and Călin Pop (Bodea et al., 2009).

His professionalism is also backed up by positive results in official international interclub competitions. Between 1985-1993, the Universitatea Cluj-Napoca team faced sixteen national champion teams in the European Champions Cup, a total of forty matches taking place. Except for the 1988/1989 edition, Universitatea Cluj-Napoca managed to pass the first phase of the European Champions Cup, eliminating teams such as Tungsram Budapest (Stănculescu, 1985), KS Lodz (Vasiliu, 1986), Elizur Tel Aviv (***, 1987), Slavia Banska Bistrica, Elmes Sibenik, Partizan Tirana (Radu, 1989; Stănculescu, 1990a), CTU Tbilisi (Iovan, 1992) and SC Tirana (Radu, 1993c). Horia Pop was instrumental in obtaining important victories against teams with a rich history of winning international competitions, such as Levski Spartak Sofia, Liliana Ronchetti Cup winner, Primigi Vincenza, European Champions Cup winner, Partizan Belgrad (***, 1986b; ***, 1986a), and Steaua Roșie Belgrad (Stănculescu, 1990a). The top performances were achieved in the 1985/1986 and 1986/1987 editions, when the team reached the quarter-final phase of the European Champions Cup (***, 1986b; Radu, 1989).

In 1992, as an acknowledgment of his professional excellence, the work put forth and the results attained, Horia Pop was presented with the highest distinction awarded to specialists in the field of physical education and sports in Romania, the title of honorary coach (***, 1993).

As a coach of the Romanian junior national team

After years in a row when teams of the Viitorul School Sports Club Cluj-Napoca won junior I champion titles, ranked among the top teams in national cadets and junior III contests, and the players Viorica Moraru, Irina Szekely, Jichișan Liana, Aurora Dragoș, Tünde Enyedi, Manasses Ildiko were promoted in the national junior team, at the proposal of the Central College of Coaches, the Romanian Basketball Federation Board appointed Horia Pop the national junior team's coach. As he displayed an ambitious nature, willing to maximize professional achievements, this position came not as an honorary title, but as a renewed prospect of working under great responsibility.

In the period 1971-1973 and 1985-1990, he was the coach of the junior national teams. The Romanian team finished on the fifth place in the 1985 edition of the Cadets European Championships, with Alexandru Moise as main coach and Horia Pop as secondary coach; also fifth in the 1987 edition, with Horia Pop as main coach and a team including Aurora Dragoș, Gabriela Petre, Ildiko Manasses, Gabriela Pandre, Antoaneta Barbu, Tünde Enyedi, Magdalena Manea, among others. In the 1989 edition, with main coach Horia Pop and secondary coach Georgeta Rusu, the national cadets team ranked fifth, with players such as Margareta Veres, Simona Morar, Angela Szenes, Daniela Moroșan and Laura Nițulescu standing out (Popescu, 1989).

Horia Pop had a productive collaboration for several years with Adriana Niculescu. In this period, the young female basketball players from Romania had a series of successes in official international competitions, notably ranking second in the Cadets European Championships in 1989 (Stănculescu & Aldea, 1989b) and winning the gold

medal in the Prietenia Tournament (Stănculescu, 1989a), finishing third in the Juniors European Championships in 1990 (Niculescu, 1990), results that range among the top performances of the junior national basketball teams in Romania.

(Adriana Niculescu, 1990)

Fig. 2 – Romania's team, winner of the silver medal at the Cadets European Championships, 1989, or EC 1990, Spain. Back row: Horia Pop, main coach, Lascu, Moroșan, Ambrus, Nițulescu, Borusz, Simion, Cocârlan, and Adriana Niculescu, secondary coach; Front row: Jiroș, Lațco, Ciupe, Ioan, Tocală and Simon.

As a university professor

Reforms of the educational system after 1989 were aimed at changing not only institutions, but also human resources, specifically those people in charge of implementing them, for the purpose of carrying out an instructive-educational process at high quality standards.

Pop's professional profile and achievements recommended him for a teaching position in the physical education and sports higher education system. Using his knowledge and vast practical experience in training junior and national cadets teams, he added a new dimension to and generated a growth in the quality of practical-methodological lessons and courses taught to specialization groups.

As a university professor, Horia Pop contributed to the early professional training of students at the Faculties of Physical Education and Sport of the "Babeș-Bolyai" and "Avram Iancu" Universities in Cluj-Napoca. He attended numerous methodological conferences and scientific meetings. He authored many articles published in prestigious journals or in volumes of scientific communication sessions of higher education institutions in Romania. He co-authored a manual with Gheorghe Roman, "Baschet - teorie și metodică"/"Basketball – theory and methodology", a valuable work, appreciated by experts in the field as well as students (Pop & Roman, 2003). Also, he collaborated with Magdalena Mușat to write a tutorial book for learning basketball, "Învățați baschetul fără profesor"/"Learning basketball without a teacher" (Mușat & Pop, 1996).

Conclusions

1. The quality of his work, his professionalism, the gold medals and the high number of top places won in official national competitions by the minibasketball and junior teams he trained, all place Horia Pop among the coaches with some of the best track records in Romanian juvenile basketball.

2. As a secondary coach and, later, as a main coach, he played a part in the Universitatea Cluj-Napoca female basketball team's win of eight national champion titles. Between 1985 and 1993, he was also involved in the training and management of the team in international interclub competitions, which secured valuable results in the European Champions Cup.

3. He had a long and fruitful activity as a coach of cadets and junior I teams, with which he achieved remarkable performances: silver medal in the Cadets European Championships in 1989; first place in the Prietenia Tournament in 1989; third place in the junior European Championships in 1990.

4. For his professional excellence, he is praised by players, colleagues, heads of various sports organizations he worked for, and many basketball supporters. For his merits, at the proposal of the Romanian Basketball Federation, the Ministry of Youth and Sports awarded him the title of honorary coach in 1992.

5. Through his valuable expertise, he contributed to the early professional training of many generations of graduates of the Faculties of Physical Education and Sports of the "Babeș-Bolyai" and "Avram Iancu" Universities in Cluj-Napoca.

6. For all these reasons, Horia Pop is rightly considered the most important coach of juvenile basketball in Cluj-Napoca and an emblematic specialist in this sport in Romania.

Conflicts of interest

Nothing to declare.

Acknowledgments

This writing is part of a series of articles on the evolution of the Universitatea Cluj-Napoca female basketball team. It recognizes Horia Pop's professional merit and serves as an homage from all the players he has trained over the years.

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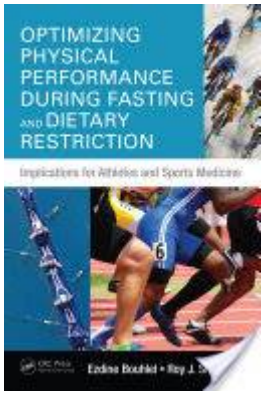
RECENT PUBLICATIONS
ACTUALITĂŢI EDITORIALE

Book reviews
Recenzii cărţi

Optimizing physical performance during fasting and dietary restriction: implications for athletes and sports medicine
(Optimizarea performanţei fizice pe parcursul posturilor şi al restricţiei alimentare: implicaţii pentru sportivi şi medicina sportivă)
Editori:Ezdine Bouhlel & Roy J. Shephard
Editura: CRC Press, august 2015
301 pagini; Preţ: £42,49 (tipărită), £34,99 (eBook = PDF)



Opţiunea de a prezenta această lucrare specială, are la bază realitatea faptului că în nu putine situaţii, şi din varii motive, indivizii aleg să presteze efort fizic susţinut, concretizat adesea în multe ore de antrenament pe săptămână, în condiţiile unei înfometări evidente. Cel mai frecvent restricţiile alimentare au conotaţii religioase, fie că ne referim la Ramadanul musulmanilor (care presupune abţinerea de la mâncare şi lichide, din zori şi până după apusul soarelui), sau la posturile creştinilor; de altfel preocupările vis-a-vis de această problematică au debutat prin observaţii şi cercetări efectuate în timpul celor 29 sau 30 de zile ale Ramadanului, aceste studii ajungând să fie şi cele mai răspândite şi mai elaborate, din punct de vedere ştiinţific. Acestor „înfometări" de sorginte religioasă li se adaugă restricţiile alimentare de altă motivaţie, cum ar fi „intrarea rapidă în greutate", în sporturile pe categorii şi, din ce în ce mai frecvent, adoptarea diverselor diete minune, care promit pierderea unui număr mare de kilograme, într-un interval de regulă foarte scurt de timp.

Ce se întâmplă cu organismul uman şi cu performanţele lui, nu numai fizice, ce bulversări ale metabolismului şi ce perturbări ale altor funcţii şi mecanisme survin în asemenea perioade, după cât timp de la începerea „postului" modificările din corp trec dincolo de anumite praguri, în ce priveşte periculozitatea, ce „îndulciri" ale regulilor ar fi suficiente pentru ca - fără să se afecteze spiritul sau semnificaţia lor - să se evite sau să se reducă mult cele mai periculoase efecte etc, sunt întrebări pe care nu doar cercetătorii ar trebui să şi le pună. Altfel spus, şi (sau mai ales) practicienii - fie ei antrenori, nutriţionişti mai mult sau mai puţin veritabili, instructori de fitness etc - precum şi sportivii, pacienţii sau clienţii, cei pe pielea cărora se aplică (sau îşi aplică) asemenea măsuri, sunt obligaţi să-şi pună acest gen de întrebări. Iar odată ce şi le pun, să caute cu obstinaţie să afle răspunsurile cele mai pertinente şi fundamentate ştiinţific, şi să ţină cu mare responsabilitate cont de ele. Mai ales în condiţiile în care există deja o carte ca aceasta, care clarifică cu acribie practic toate întrebările, nedumeririle şi dilemele ce se pot ivi.

Înainte însă de a spune orice altceva despre cartea în sine, se cuvine să reţinem câteva note referitoare la cel de-al doilea editor, *Roy J. Shephard*, profesor emeritus de fiziologie aplicată al Facultăţii de Kinesiologie şi Educaţie Fizică din cadrul Universităţii Toronto, realmente un gigant al ştiinţelor exerciţiului fizic şi sportului. Celor care vor fi intrigaţi de o atât de laudativă etichetă, le sugerăm să verifice cât de îndreptăţită este ea, vizitând site-ul http://www.members.shaw.ca/royjshep/index.htm. Noi, aici, mulţumindu-ne doar să menţionăm că în 65 de ani de activitate ştiinţifică (1951-2016), numele său a apărut pe coperta a 132 cărţi, cea de faţă fiind a 131-a, zestre la care se adaugă 2071 articole (nu este greşeală !), publicate ca unic autor sau în colaborare.

Aşa cum se precizează şi în prefaţă, textul cărţii are la bază cele mai recente rezultate ale cercetărilor de valoare în domeniu, publicate în reviste de mare circulaţie şi cu factori de impact dintre cei mai relevanţi, iar cunoştinţele reţinute sunt prezentate simplu şi clar, pe înţelesul nu doar al medicilorsportivi şi nutriţionişti, ci şi al studenţilor în educaţie fizică, antrenorilor, instructorilor de fitness, nutriţioniştilor fără pregătire universitară medicală, şi chiar sportivilor şi practicanţilor exerciţiului fizic pentru sănătate. Lucru posibil şi ca urmare a faptului că dintre cei 4 contributori, doar Shephard nu este din Tunisia, astfel încât în redactarea majorităţii capitolelor pe lângă bogata şi cât se poate de actuala bibliografie, autorii s-au bazat şi pe experienţa proprie, de supervizare directă a sportivilor, pe parcursul Ramadanului. Mai mult, pentru facilitarea achiziţionării şi aplicării efective a cunoştinţelor conţinute, fiecare capitol este prevăzut cu o listă clar conturată de aspecte obligatoriu a fi înţelese şi însuşite, cu definiţii ale termenilor şi conceptelor cheie, şi cu un rezumat succint al elementelor cu implicaţii practice directe pentru antrenori

şi/sau sportivi, foarte utile inclusiv pentru discuţiile tematice care ar trebui să aibă loc în mod curent între ei.

Cartea are 13 capitole; toate - cu excepţia celui de-al doilea - având sub 25 de pagini. Trei dintre ele sunt semnate doar de Prof. Shephard, iar la celelalte el este coautor; aspect care, dată fiind anvergura sa ştiinţifică greu de egalat, pledează de asemenea, indirect dar suficient de persuasiv pentru cunoscători, în favoarea valorii deosebite a lucrării. Secvenţa introductivă, *Caracteristicile posturilor*, defineşte particularităţile şi cerinţele posturilor şi restricţiilor alimentare, de la înfometările totale, la dieta vegan şi la postul intermitent al Ramadanului, respectiv de la principiile postirii în religia ortodoxă greacă, la postul de 10 sau 21 zile, propovăduit de profetul Daniel în Biblie. Ceea ce urmează, sub titul *Modificările masei corporale şi ale echilibrului energetic, pe parcursul posturilor şi al restricţiilor alimentare*, reprezintă indiscutabil piatra unghiulară a edificiului cărţii, dar şi a problematicii abordate de aceasta. Dovadă este de altfel şi faptul că i se alocă cea mai mare întindere (41 de pagini), în care sunt dezvoltate modificările din plan „macro", adică de la nivelul masei şi compoziţiei corporale, al rezervoarelor de energie şi al echilibrului energetic al corpului. După care vine o secţiune ce înglobează patru capitole, dedicate inevitabilelor, importantelor şicomplicatelor-interconectatelor modificări/ adaptări/perturbări ale metabolismului *glucidic*, *lipidic*, *protidic şi hidromineral*. Toate, dar mai cu seamă acestea din urmă având un impact evident - şi deloc pozitiv - asupra performanţelor fizice, cu deosebire în cazul orelor prelungite de restricţie lichidiană, din zilele Ramadanului. Contexte în care buna cunoaştere şi aplicarea riguroasă a metodelor de evaluare a deshidratării, cu deosebire a celor utilizabile pe teren, reprezintă condiţii obligatorii ale monitorizării în deplină siguranţă a sportivilor, mai ales a celor cu multe ore săptămânale de pregătire.

Răsunetul perioadelor de post în planul *hormonilor* (evoluţia diverşilor hormoni, cu deosebire a cortizolului şi melatoninei, pe parcursul celor 24 ore ale zilei) şi *al ritmurilor circadiene*, face obiectul capitolului 7. Iar când vine vorba de acest ultim tip de consecinţe, trebuie precizat că perturbarea ritmului circadian şi dereglarea succesiunii perioadelor de veghe şi somn, survin mai ales în cazul postului respectat de musulmani, după a 10-a zi. De unde amplificarea efectelor acestor perioade dincolo de obişnuitele manifestări din sfera strictă a biologicului, fie că este vorba de evoluţia temperaturii corporale sau - foarte important - de cantitatea şi calitatea somnului: mersul la culcare după miezul nopţii, numărul mai mic de ore de somn, scăderea ponderii somnului profund în favoarea celui superficial etc. Pe de altă parte, de dereglări nu scapă nici *sistemele de apărare antioxidativă* ale organismului, sisteme foarte importante pentru organismul ce prestează efort fizic, pentru a-l proteja de agresiunea oxidativă puternic augmentată; se ştie că în efort, datorită creşterii de mai multe ori a consumului de oxigen, în raport de cel din repaus, se multiplică în mod corespunzător şi producţia de radicali liberi de oxigen.

Toate bulversările creionate telegrafic mai sus, conduc în ultima instanţă *la diminuarea performanţelor fizice şi cognitive, şi a vigilenţei* în general (Cap. 9). Dacă scăderile performanţelor fizice pure (forţă, viteză, rezistenţă) pot să deranjeze mai puţin, ele fiind mai uşor de intuit, mai cunoscute şi, drept urmare, implicit asumate, efectele Ramadanului în celelalte planuri ar trebui privite cu mai mare atenţie şi responsabilitate. Şi asta atât din perspectivă individuală, cât şi pe un plan mai larg, la nivel social, dat fiind faptul că ele se pot concretiza în accidente, care pot face ca impactul negativ al postului respectiv să se prelungească şi dincolo de ultima zi în care el este respectat. Ne referim aici la faptul că, datorită scăderii vigilenţei şi accentuării iritabilităţii, creşte frecvenţa accidentelor nu doar în antrenamente şi competiţii, ci şi a accidentelor care nu au legătură cu activitatea sportivă, inclusiv a celor de circulaţie. Ultimele capitole ale lucrării oferă sugestii şi sfaturi pentru ca cei care ţin post să facă faţă cât mai bine restricţiilor pe care acesta le presupune. Astfel, dacă în capitolul 10 sunt reţinute recomandări ce ţin strict de nutriţie - subcapitolele respective referindu-se la grijile ce trebuie avute în ce priveşte necesarul zilnic de *glucide*, *lipide*, *protide*, *apă şi antioxidanţi*, dar şi la măsurile complementare ce pot contracara sau atenua impactul negativ asupra organismului sportivilor, în următorul, ni se livrează idei privitoare la adaptările ce se pot aduce *programelor de antrenament ale sportivilor*, astfel încât performanţa lor din competiţii să sufere cât mai puţin. Ce metode şi mijloace se pot folosi, în vederea *refacerii* rapide si cât mai complete după eforturile din antrenamente şi a pregătirii, inclusiv mentale, pentru confruntările oficiale viitoare, ni se spune în penultimul capitol, pentru ca în ultimul să găsim referiri la anumite *activităţi şi condiţii medicale particulare*, care au o legatură mai mare sau mai mică cu preceptele şi rigorile posturilor şi/sau care pot fi favorizate de ele. Avem colectate aici cunoştinţe şi recomandări referitoare la controlul antidoping şi administrarea de medicamente, în cazul sportivilor care ţin post, precum şi la riscurile de accidentare şi de şoc caloric, semnificativ mai mari cu deosebire atunci când la restricţia alimentară se asociază şi cea lichidiană. Toate, ca de altfel întregul conţinut al cărţii, constituindu-se în argumente suficiente pentru a concluziona că avem de-a face, din nou, cu o lucrare care are toate calităţile pentru a-şi găsi locul în bibliotecile marii majorităţi a celor care au legătură cu sportul, cu exerciţiul fizic în general, dar nu numai.

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SCIENTIFIC MEETINGS
MANIFESTĂRI ŞTIINŢIFICE

The National Conference „Nutrition - The Future Medicine", Fifth Edition, 25-27 November 2015, Cluj-Napoca

Conferinţa Naţională „Nutriţia - Medicina Viitorului", Ediţia a V-a, 25-27 Noiembrie 2015, Cluj-Napoca

The fifth edition of The National Conference „Nutrition – The Future Medicine" took place on 25-27 November 2015, in Cluj-Napoca. The event was coordinated by the Nutrition and Health Association, with the support of the "Iuliu Haţieganu" University of Medicine and Pharmacy Cluj-Napoca, the Romanian Society of Pharmaceutical Sciences and the Academy of Romanian Scientists, the Cluj-Napoca branch, and it was part of the program of the Annual Meeting of the "Iuliu Haţieganu" University of Medicine and Pharmacy Cluj-Napoca 2015.

Now, at its fifth edition, it is a good time to recall the evolution of an event in which our university could take pride. In 2011, the first national symposium dedicated to students in the Nutrition and Dietetics study program was organized under the title The Symposium "Nutrition – The Future Medicine", an initiative of teachers and students in Cluj-Napoca. The first edition of the symposium was attended by 104 students from Cluj-Napoca, Târgu-Mureş and Timişoara, and national personalities in the field of nutrition were invited as speakers. The symposium program consisted of oral presentations about nutrition, a round table on the "Dietitian – a profession for the future" and a workshop on "Healthy Lifestyle". Three editions were held on 14-15 December 2012, 24-25 October 2013, and 19-21 November 2014, respectively, the event gradually gaining special importance and receiving guests from abroad: Prof. Dr. Jordi Mañes (Spain) - professor of Food Science at the University of Valencia, coordinator of the Master of Food Science at the same university, Reka Bozo Kegyes (Hungary) - chief clinical dietitian, administrative assistant of the European Federation of the Associations of Dietitians (EFAD), Elisabet Rothenberg (Sweden) - professor at the University of Gothenburg, clinical dietitian specialized in nutrition for older persons.

In 2015, the National Conference "Nutrition - the Future Medicine" was attended by over 300 participants from all over the country, involved in areas such as Nutrition and Dietetics, Medicine, Pharmacy, Biology, Chemistry and Alternative Medicine. The activities included were: two workshops ("Sport and a healthy lifestyle" and "The dietitian law - history and innovation") and a series of lectures, presentations of scientific papers and a poster session. The conference proceedings were opened by Prof. Dr. Gianina Crişan - Dean of The Faculty of Pharmacy of the "Iuliu Haţieganu" UMPh Cluj-Napoca, and Prof. Dr. Doina Miere - President of the Scientific Committee of the Conference. The list of speakers included: Prof. Dr. Monica Lencu – "Iuliu Haţieganu" UMPh Cluj-Napoca, Dr. Şerban Damian - specialist in sports nutrition, Biol. Nutr., Dr. Marie Vrânceanu - specialist in nutrigenetics and food liposuction, Assoc. Prof. Dr. Ramona Suharoschi – UASVM Cluj-Napoca, Assoc. Prof. Dr. Valeria Laza – "Iuliu Haţieganu" UMPh Cluj-Napoca, Teaching Assist. Dr. Ioana Grigorescu – "Iuliu Haţieganu" UMPh Cluj-Napoca, Lecturer Dr. Dan Vodnar - UASVM Cluj-Napoca, Assoc. Prof. Dr. Ioan Vereşiu – "Iuliu Haţieganu" UMPh Cluj-Napoca, as well as dietitians, professional practitioners in various multidisciplinary medical teams.

Welcome and join us in 2016!

* * *

În perioada 25-27 noiembrie 2015, a avut loc cea de-a cincea ediţie a Conferinţei Naţionale «Nutriţia – Medicina Viitorului». Evenimentul s-a desfăşurat sub coordonarea Asociaţiei Nutriţie şi Sănătate, cu sprijinul Universităţii de Medicină şi Farmacie "Iuliu Haţieganu" Cluj-Napoca, Societăţii de Ştiinte Farmaceutice din România, Academiei Oamenilor de Ştiinţă, filiala Cluj şi a făcut parte din programul Zilelor Universităţii de Medicină şi Farmacie "Iuliu Haţieganu" Cluj-Napoca, 2015.

Aflată la cea de-a cincea ediţie, se cuvine să parcurgem evoluţia unui eveniment cu care universitatea noastră se poate mândri. În anul 2011, s-a organizat primul simpozion naţional dedicat studenţilor de la programul de studii Nutriţie şi Dietetică, sub titulatura Simpozionul «Nutriţia – Medicina Viitorului», iniţiativă a cadrelor didactice şi studenţilor acestei specializări din Cluj-

Deputy Mircea Irimie - invited speaker at the Conference as the initiator of the Legislative Proposal on the regulation of the dietitian profession

Biol. Nutr. Dr. Marie Vrânceanu

Prof. Dr. Gianina Crişan - Dean of The Faculty of Pharmacy, "Iuliu Haţieganu" UMPh Cluj-Napoca

Prof. Dr. Monica Lencu - "Iuliu Haţieganu" UMPh Cluj-Napoca, 4th Medical Clinic, Cluj-Napoca

Workshop "The dietitian law - history and innovation".

Workshop "Sport and a healthy lifestyle".

Bachelor Students in the Nutrition and Dietetics Study Program in Cluj-Napoca at the fifth edition of The National Conference "Nutrition - The Future Medicine"

Napoca. La prima ediţie a simpozionului au participat 104 studenţi din centrele universitare Cluj-Napoca, Târgu-Mureş şi Timişoara şi au fost invitaţi să ţină prelegeri personalităţi marcante din domeniu. Programul Simpozionului a constat în: audierea unor conferinţe din domeniul nutriţei, organizarea unei mese rotunde cu tema "Dietetician – o profesie pentru viitor" şi participarea la un workshop cu tema "Stil de viaţă sănătos". Alte trei ediţii s-au desfăşurat în perioada 14-15 decembrie 2012, 24-25 octombrie 2013 şi, respectiv, 19-21 noiembrie 2014, treptat evenimentul dobândind o însemnătate deosebită, primind şi invitaţi din străinătate: Prof. Dr. Jordi Mañes (Spania) – profesor universitar în domeniul Bromatologiei în cadrul Universităţii din Valencia, coordonator al Masteratului de Ştiinţele Alimentului în cadrul aceleiaşi universităţi, Reka Bozo Kegyes (Ungaria) - dietetician clinician şef, asistent administrativ al European Federation of the Associations of Dietitians (EFAD), Elisabet Rothenberg (Suedia) - profesor în cadrul universităţii din Gothenburg, dietetician clinician, specializată în nutriţia vârstnicului.

În 2015 Conferinţa Naţională «Nutriţia - Medicina Viitorului" a reunit peste 300 de participanţi din întreaga ţară, din domenii precum Nutriţie şi Dietetică, Medicină, Farmacie, Biologie, Chimie şi Medicină Alternativă.

Activităţile celor trei zile au cuprins două Workshop-uri („Sportul şi un stil de viaţă sănătos” şi „Legea Dieteticianului - istoric şi noutate”) şi o serie de conferinţe, prezentări de lucrări ştiinţifice şi o sesiune de postere. Deschiderea lucrărilor conferinţei a fost făcută de Prof. Dr. Gianina Crişan - Decan al Facultăţii de Farmacie, UMF ”Iuliu Haţieganu” Cluj-Napoca şi Prof. Dr. Doina Miere - Preşedintele Comitetului Ştiinţific al Conferinţei, iar printre cei care au susţinut prezentări se numără: Prof. Dr. Monica Lencu - UMF ”Iuliu Haţieganu” Cluj-Napoca, Dr. Şerban Damian - specialist în nutriţie sportivă, Biol. Nutr. Dr. Marie Vrânceanu - specialist în nutrigenetică şi liposucţie alimentară, Conf. Dr. Ramona Suharoschi - USAMV Cluj-Napoca, Conf. Dr. Valeria Laza - UMF ”Iuliu Haţieganu” Cluj-Napoca, Asist. Univ. Dr. Ioana Grigorescu - UMF ”Iuliu Haţieganu” Cluj-Napoca, Şef lucr. Dr. Dan Vodnar - USAMV Cluj-Napoca, Conf. Dr. Ioan Vereşiu - UMF ”Iuliu Haţieganu” Cluj-Napoca, la care se adaugă dieteticieni, practicieni ai profesiei de dietetician în diverse echipe medicale pluridisciplinare.

Lorena Filip, Oana Stanciu, Anamaria Cozma, Roxana Banc, Laura Gavrilaş, Doina Miere
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EVENTS
EVENIMENTE

Rugby feast in Iclod
Sărbătoarea rugbyului la Iclod

When one enters a Mayor's Office in a rural area and sees a banner with a quote from Pierre de Coubertin at a place of honor in the council room, it means that sport occupies a privileged position in the commune concerned. This is really the case of Iclod. In this commune in the Someşul Mic Valley, nothing comes second. From the commune's administration to culture and sport investments, all aspects have their own importance. The events of the third edition of the Spring Rugby Cup (initiated as part of the action of implementing rugby in schools), which we attended, made a particular impression on us. An atmosphere of celebration, special guests and highly disputed games were the characteristics of this beautiful competition of school children, which took place in the modern sports hall of the Iclod Middle School, and we must not forget the fair play that was present throughout the events. No less than 8 school rugby teams from Cluj-Napoca (2 teams), Buza (2 teams), Sînnicoara, Panticeu, Livada and Iclod, localities where rugby is gaining increasing ground, participated. The fact that Cluj is a strong center for the game with the oval ball is known, but we are happy to point out the emergence of other groups in communes such as Panticeu or Buza. So, rugby is popular in rural areas as well, which is gratifying in the context of Romanian sport. This was noted by the prestigious guests of the meeting in Iclod, Mr. Gheorghe Sabău, development director of the Romanian Rugby Federation for the region of Transylvania, the main referee of the competition, the former international rugby players Ioan Bucan and Petrică Motrescu, as well as the former players of the University Cluj, Silviu Spătaru (who is originally from Iclod), Nicolae Copil and Simion Mărginean. All were particularly impressed by this real feast of Romanian school rugby, organized by the Romanian Rugby Federation, the Mayor's Office of the Iclod commune and the Iclod Middle School. The tournament was also attended by the well-known man of sport in Cluj, Prof. Dr. Traian Bocu, Editor-in-Chief of the "Palestrica of the Third Millennium" journal, a connoisseur of sport in the Someş area. Year after year, Prof. Bocu organizes the traditional scientific meeting and competition "The Gheorghe Moceanu Cup", dedicated to the personality of the first professor of physical education in Romania, born in Orman village, Iclod commune. At the press conference held in the Mayor's Office, the deputy mayor of the Iclod commune, Gheorghe Moţ, and the local councilor Ionel Hurducaş were also present. Through discussions with the former international players, the most important moments of Romanian rugby, a sport that brought us great satisfaction particulary in the 60-70s, were recalled. The host of the competition was the mayor of the Iclod commune, Mr. Emil Pîrţoc, President of Honor of the Central Referee College of the Romanian Rugby Federation, the architect of many successes in this sport, who over the past 4 years has worked wonders in the social, cultural and sports development of the locality near Gherla city. The guests in Iclod also visited the construction site of the new stadium near the railway station of Iclod, where a 600-seat stand, attendant facilities and a synthetic athletic track are under work. A fitness room and a tennis court will also be built on the premises. This happens in a commune where physical exercise and sport is one of the priorities of the local administration. After the introduction of methane gas, tap water and sewage, the commune center will also have a modern sports facility, as few towns in this area do. In Iclod, a good farmer makes a good farm!

Lastly, we should not forget to mention the final ranking of the Spring Cup in Iclod. The team of the "Eugen Pora" Theoretical High School in Cluj-Napoca (coach Răzvan Roman) ranked first, followed by the team of the Middle School in Panticeu, trained by Prof. Bogdan Mureşan, while the bronze medal was won by the school team of the Middle School in Sânnicoara, trained by Bogdan Chindriş. The other teams were awarded mentions, but all received diplomas and sports equipment. Some were also rewarded with a rugby ball. What is important is that we witnessed a touching celebration of school sport, and we will definitely come back next year, on the occasion of the 4th edition!

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Când intri într-un sediu de Primărie din mediul rural şi, la loc de cinste în sala de consiliu, vezi pe un banner un citat din Pierre de Coubertin, asta înseamnă că în comuna respectivă sportul deţine un loc privilegiat. La Iclod, într-adevăr, aşa este. În comuna de pe Valea Someşului Mic nimic nu e pe planul doi. De la problemele edilitar-gospodăreşti până la investiţiile din domeniul culturii şi al sportului, toate aspectele îşi au importanţa lor. Asistând la întrecerile celei de a treia ediţii a Cupei Primăverii la rugby (iniţiată în cadrul acţiunii de implementare a rugbyului în şcoli), am rămas cu o impresie deosebită. Atmosferă sărbătorească, invitaţi de marcă şi meciuri deosebit de disputate - iată

The opening ceremony of the Spring Cup, organized by the Romanian Rugby Federation, the Mayor's Office of the Iclod commune and the Iclod Middle School.

A protocol picture, with the Mayor of the Iclod commune, Emil Pârţoc (to the right of the poster); Ioan Bucan (to the left of the poster); Petrică Motrescu (second to the left), Nicolae Copil (first to the left), Silviu Spătaru (second to the right), Simion Mărginean (first to the right).

Presentation of international rugby players from Cluj, by the Mayor Emil Pârţoc (first to the right): Ioan Bucan, Gheorghe Sabău, development director of the Romanian Rugby Federation (holding the ball), Petrică Motrescu, Silviu Spătaru, Nicolae Copil, Simion Mărginean.

A game phase during the Spring Cup.

Handing of awards by Mayor Emil Pârţoc.

Handing of awards by the international player Petrică Motrescu.

Presentation of the team leaders, and handing of awards.

Meeting with the Mayor Emil Pârţoc, in the Council room of the Mayor's Office of the Iclod commune.

A "working visit" to the future sports facility of the Iclod commune.

caracteristicile frumoasei competiţii dedicate elevilor şi desfăşurate în moderna sală de sport a Şcolii Gimnaziale din Iclod, la care trebuie să adăugăm sportivitatea ce a domnit pe toată durata întâlnirilor. Au fost prezente nu mai puţin de 8 echipe şcolare de rugby aparţinînd unităţilor de învăţământ din Cluj-Napoca (2 echipe), Buza (tot 2 formaţii), Sânnicoara, Panticeu, Livada şi Iclod, localităţi unde rugbyul cîştigă tot mai mult teren. Ştiam că Clujul este un centru puternic al sportului cu mingea ovală, dar semnalăm cu bucurie apariţia unor grupări din comune ca Panticeu sau Buza. Iată că rugbyul se bucură de popularitate şi la sate - lucru îmbucurător în peisajul sportului nostru. Este ceea ce au remarcat şi invitaţii de marcă ai întâlnirii de la Iclod, adică domnii Gheorghe Sabău, director de dezvoltare din cadrul FR Rugby, regiunea Transilvania, arbitrul principal al competiţiei, foştii internaţionali de rugby Ioan Bucan şi Petrică Motrescu, precum şi foştii jucători ai Universităţii Cluj, Silviu Spătaru (de loc chiar din Iclod), Nicolae Copil şi Simion Mărginean. Cu toţii au rămas cu o impresie deosebită după această adevărată sărbătoare a rugbyului şcolar din ţara noastră, organizată de FR Rugby, Primăria comunei Iclod şi Şcoala Gimnazială din localitate. La turneu a mai participat şi cunoscutul om de sport clujean, Prof. univ. dr. Traian Bocu, redactor-şef al revistei „Palestrica Mileniului III", un bun cunoscător al fenomenului sportiv de pe meleagurile someşene. An de an, domnia sa organizează tradiţionala manifestare ştiinţifică şi competiţie „Cupa Gheorghe Moceanu", dedicată personalităţii primului profesor de educaţie fizică din România, născut în satul Orman, comuna Iclod. La conferinţa de presă desfăşurată la sediul Primăriei au mai fost prezenţi viceprimarul comunei Iclod, Gheorghe Moţ şi consilierul local Ionel Hurducaş. Prin discuţiile purtate cu foştii internaţionali, au fost rememorate cele mai importante momente ale rugbyului românesc, un sport care, mai ales în anii 60-70, ne-a adus satisfacţii.

Amfitrionul competiţiei a fost primarul comunei Iclod, domnul Emil Pîrţoc, preşedinte de onoare al Colegiului Central al Arbitrilor din cadrul Federaţiei Române de Rugby, artizanul multor succese ale acestei discipline sportive şi care în ultimii 4 ani a făcut adevărate minuni în dezvoltarea social-culturală şi sportivă a aşezării din vecinătatea municipiului Gherla. Oaspeţii aflaţi la Iclod au vizitat şi şantierul noului stadion ce se construieşte în apropierea Gării CFR din Iclod, unde deja se lucrează la amenajarea tribunei cu 600 de locuri, a anexelor necesare şi a pistei sintetice de atletism. Tot acolo va fi o sală de fitness şi un teren de tenis. Şi asta într-o comună precum Iclod, unde mişcarea fizică şi sportul se află printre priorităţile administraţiei locale. După introducerea gazului metan, a apei potabile şi a canalizării, iată că centrul de comună va avea şi o bază sportivă modernă, aşa cum puţine oraşe au în zona noastră. La Iclod omul sfinţeşte locul!

În încheiere, să nu uităm să amintim clasamentul final al „Cupei Primăverii" de la Iclod. Pe primul loc s-a clasat echipa Liceului Teoretic „Eugen Pora" Cluj-Napoca (antrenor Răzvan Roman), urmată de formaţia Şcolii Gimnaziale din Panticeu pregătită de prof. Bogdan Mureşan, iar bronzul a revenit elevilor de la Şcoala Gimnazială Sînnicoara, îndrumaţi de Bogdan Chindriş. Celelalte echipe au primit menţiuni, dar cu toţii s-au întors acasă cu diplome şi echipament sportiv. Unii au fost răsplătiţi şi cu câte o minge de rugby. Important este că am asistat la o emoţionanţă sărbătoare a sportului şcolar, urmând să revenim şi la anul, cu ocazia celei de a IV-a ediţii!

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EVENTS
EVENIMENTE

The 2016 Cluj mountain center cross-country skiing competition
Întrecerea centrelor montane din judeţul Cluj, la schi-fond, 2016

This year's competitions were marked by the 30th edition of the *Pelaghia Roşu* Cup, held in Mărişel. Although the third in chronological order (23 January), the event distinguished itself through a particular organization, initiated by the Director of the school in Mărişel, Prof. Mirela-Dana Feneşan. At the award ceremony closing this event, a review of cross-country skiing competitions in the Mărişel commune was made. In 1974, the first edition of the cross-country skiing competition, which was named the *Pelaghia Roşu* Cup in the memory of the local heroine, a fighter in the 1848 Revolution, was initiated by the school Director of that time, Teodor Şandor. In that year's event, the Mărişel School won the first place, the second place was won by the Măguri-Bogdăneşti School, and the Beliş School ranked third. In 2002, the mayor of the Mărişel commune, Prof. Ioan Mariş, in collaboration with the Cluj County School Inspectorate, revived this tradition, which has reached the 33rd edition in 2016.

During the course of time, a number of inspectors, directors, mayors, deputy mayors and professors of the technical team have been involved in the organization of this competition. As a sign of recognition, a number of personalities were awarded distinctions for their commitment, professionalism and achievements.

The school inspectors who participated in the organization of this competition over the years were as follows: Valentin Claudiu Cuibus, Mariana Pop, Török Zoltan, Ioan Lazăr, Ioan Cătinaş, Cristian Potora. The following school directors were involved: Teodor Şandor, Veronica Domşa, Polixenia Mariş, Dana Feneşan. The participating mayors were: Alexandru Roşu, Liviu Hetea, Ioan Mariş, Traian Mariş. Deputy mayors: Aurel Matiş, Viorel Ghic. The technical team: Ioan Mureşan – competition director, Ioan Cătinaş, Victor Ursuţiu, Vasile Orăsan, Mircea Elecheş, Iuliu Mako, Eugen Marean.

If at the beginning, only 3 or 4 cross-country skiing mountain centers competed, in 2016, 7 mountain sports centers participated in the event: Râşca, Beliş, Rachiţele, Rogojel, Sâncrai, Măguri Bogdăneşti, Mărişel.

The 2016 Technical and Referee Commission was formed by professors who ensured the success of competitions: Cristian Potora, Ioan Mureşan, Mircea Eleches, Laura Ionescu, Ramona Ilea, Sorina Pop, Mihaly Bela, Traian Bocu.

The other participating teams and the winners by age groups in this year's edition are mentioned in the tables below.

* * *

Competiţiile din anul acesta au fost marcate de cea de a 30-a ediţie a Cupei *Pelaghia Roşu* desfăşurată la Mărişel. Cu toate că aceasta a fost a treia în ordinea desfăşurării (23 ianuarie), competiţia s-a remarcat printr-o organizare deosebită, pusă în operă de însăşi directoarea şcolii din localitate, Prof. Mirela-Dana Feneşan. În cadrul festivităţii de premiere care a urmat competiţiei, a fost făcută o retrospectivă a ceea ce a însemnat Concursul de schi fond în comuna Mărişel. În anul 1974 a fost prima ediţie a concursului de schi fond, dotat cu Cupa *Pelaghia Roşu*, în amintirea eroinei locale, luptătoare paşoptistă, iniţiat de directorul din acea vreme Teodor Şandor . În acel an locul I a fost câştigat de Şcoala Mărişel, pe locul II s-a clasat Şcoala din Măguri-Bogdăneşti, iar pe locul III Şcoala din Belis. Concursul s-a desfăşurat an de an până în anul 1989 când a fost întrerupt o bună bucată de vreme. În anul 2002, primarul comunei Mărişel, Prof. Ioan Mariş împreună cu Inspectoratul Şcolar Judeţean Cluj a reluat această tradiţie care a ajuns în 2016 la a XXX-a ediţie.

De-a lungul timpului au fost implicaţi în organizarea concursului mai mulţi inspectori, directori, primari, viceprimari şi profesori din echipa tehnică. În semn de recunoaştere au fost premiaţi cu plachete pentru devotament, profesionalism şi realizări, o serie de personalităţi:

Inspectorii şcolari implicaţi de-a lungul timpului au fost următorii: Valentin Claudiu Cuibus, Mariana Pop, Török Zoltan, Ioan Lazăr, Ioan Cătinaş, Cristian Potora. Directorii de şcoală implicaţi au fost următorii: Teodor Şandor, Veronica Domşa, Polixenia Mariş, Dana Feneşan. Primarii implicaţi au fost următorii: Alexandru Roşu, Liviu Hetea, Ioan Mariş, Traian Mariş. Viceprimari: Aurel Matiş, Viorel Ghic. Echipa Tehnica: Ioan Mureşan - director de concurs, Ioan Catinaş, Victor Ursuţiu, Vasile Orăsan, Mircea Elecheş, Iuliu Mako, Eugen Marean.

Dacă la început concurau doar 3 sau 4 centre montane de schi fond, in anul 2016 au participat 7 centre sportive montane: Râşca, Beliş, Rachiţele, Rogojel, Sâncrai, Măguri Bogdăneşti, Mărişel.

Comisia tehnică şi de arbitri 2016 a fost formată din profesori care au asigurat reuşita competiţiilor: Cristian Potora, Ioan Mureşan, Mircea Eleches, Laura Ionescu, Ramona Ilea, Sorina Pop, Mihaly Bela, Traian Bocu.

Celelalte echipe participante şi câştigătorii pe categorii de vârstă la ediţia din acest an, sunt menţionaţi în tabelele care urmează.

1. Rogojel Center - The *Vlădeasa* Cup, 4th edition, 16 January 2016

Place	Girls 11-12 years	Boys 11-12 years	Girls 13-14 years	Boys 13-14 years	Relay	Team ranking
1	Mariş Larisa-Mărişel	Forţ Radu-Rogojel	Gligan Adina-Râşca	Tomoş Ioan-Râşca	Rogojel	Râşca
2	Török Boglarka-Sâncraiu	Tomoş Daniel-Râşca	Trif Cristina-Beliş	Răşinar Valentin-Răchiţele	Râşca	Rogojel
3	Pleş Eliza-Rogojel	Matiş Sebastian-Beliş	Todoruţ Ioana-Răchiţele	Potra Ioan-Răchiţele	Sâncraiu	Răchiţele

Physical education teacher: Aurel Dan Crişan - organization
Director: Prof. Mariana Paşcalău
Mayor: Daniel Vasile Creţ
Mountain rescue – organization and assistance: Dorin Potra

2. Beliş Center - The *Scoruşet* Cup, 21st edition, 23 January 2016

Place	Girls 11-12 years	Boys 11-12 years	Girls 13-14 years	Boys 13-14 years	Relay	Team ranking
1	Marton Annet-Sâncraiu	Forţ Radu-Rogojel	Gligan Adina-Râşca	Tomoş Ioan-Râsca	Râşca	Râşca
2	Török Boglarka-Sâncraiu	Tomoş Daniel-Râşca	Todoruţ Ioana-Răchiţele	Răşinar Valentin-Răchiţele	Rogojel	Rogojel
3	Giurgiu Carmen-Beliş	Iancu Andrei-Măguri Răcătău	Trif Cristina-Beliş	Potra Ioan-Răchiţele	Sâncraiu	Răchiţele

Physical education teacher: Anghel Todea
Director: Mihaela Mocean
Mayor: Viorel Crainic
Deputy mayor: Mariana Ciumăfaie
Mountain rescue – organization and assistance: Dorin Potra

3. Mărişel Center - The *Pelaghia Roşu* Cup, 33rd edition, 6 February 2016

Place	Girls 11-12 years	Boys 11-12 years	Girls 13-14 years	Boys 13-14 years	Relay	Team ranking
1	Török Bogláka-Sâncraiu	Matiş Sebastian-Beliş	Gligan Adina-Râşca	Potra Ioan-Răchiţele	Râşca	Râşca
2	Abrudan Alina-Mărişel	Vâtcă Claudiu-Râşca	Todoruţ Ioana-Răchiţele	Tomoş Ioan-Râşca	Mărişel	Răchiţele
3	Berindei Andreea-Măguri-Bogdăneşti	Mariş Sebastian-Măguri-Bogdăneşti	György Erzesebet-Sâncraiu	Safta Claudiu-Mărişel	Sâncraiu	Rogojel

Physical education teacher: Sorin Brăileanu
Director: Prof. Dana Feneşan
Mayor: Traian Mariş
Mountain rescue: Dorin Potra

4. Râşca Center - The *Sălănducu* Cup, 18th edition, 13 February 2016

Place	Girls 11-12 years	Boys 11-12 years	Girls 13-14 years	Boys 13-14 years	Relay	Team ranking
1	Matiş Larisa-Mărişel	Tomoş Daniel-Râşca	Gligan Adina-Râşca	Răşinar Valentin-Răchiţele	Râşca	Râşca
2	Giurgiu Carmen-Beliş	Forţ Radu-Rogojel	Todoruţ Ioana-Răchiţele	Tomoş Ioan-Râşca	Răchiţele	Rogojel
3	Abrudan Alina-Mărişel	Todoruţ Pavel-Răchiţele	Trif Cristina-Beliş	Lăpuşte Andrei-Râşca	Rogojel	Răchiţele

Physical education teacher: Ardelean Ilea - organization
Director: Prof. Florin Cociş
Mayor: Ioan Morar
Deputy mayor: Traian Matiş
Mountain rescue: Dorin Potra

5. Băişoara Center - The *Little Mountain Hunters* Cup, 37th edition, 21 February 2016

Place	Girls 11-12 years	Boys 11-12 years	Girls 13-14 years	Boys 13-14 years	Relay	Team ranking
1	Marton Anette-Sâncraiu	Tomoş Daniel-Râşca	Gligan Adina-Râşca	Safta Claudiu-Mărişel	Râşca	Râşca
2	Mariş Larisa-Mărişel	Forţ Radu-Rogojel	Trif Cristina-Beliş	Tomoş Ioan-Râşca	Beliş	Mărişel
3	Török Boglarka-Sâncraiu	Matiş Sebastian-Beliş	György Erzsebet-Sâncraiu	Răşinar Valentin-Răchiţele	Rogojel	Rogojel

Organizers: ISJ Cluj, Prof. Cristian Potora – School Inspector - physical education
Director: Prof. Monica Horodinca - Children's Palace Cluj
Competition Director: Prof. Mircea Elecheş - coordinator of the Technical and Referee Commission

1. Centrul Rogojel - Cupa *Vlădeasa,* ediţia a IV-a, 16 ianuarie 2016

Loc	Fete 11-12 ani	Băieţi 11-12 ani	Fete 13-14 ani	Băieţi 13-14 ani	Ştafetă	Clasament echipe
1	Mariş Larisa-Mărişel	Forţ Radu-Rogojel	Gligan Adina-Râşca	Tomoş Ioan-Râşca	Rogojel	Râşca
2	Török Boglarka-Sâncraiu	Tomoş Daniel-Râşca	Trif Cristina-Beliş	Răşinar Valentin-Răchiţele	Râşca	Rogojel
3	Pleş Eliza-Rogojel	Matiş Sebastian-Beliş	Todoruţ Ioana-Răchiţele	Potra Ioan -Răchiţele	Sâncraiu	Răchiţele

Prof. ed. fizică: Aurel Dan Crişan - organizare
Director: Prof. Mariana Paşcalău
Primar: Daniel Vasile Creţ
Salvamont - organizare şi asistenţă: Dorin Potra

2. Centrul Beliş - Cupa *Scoruşet,* ediţia a XXI-a, 23 ianuarie 2016

Loc	Fete 11-12 ani	Băieţi 11-12 ani	Fete 13-14 ani	Băieţi 13-14 ani	Ştafetă	Clasament echipe
1	Marton Annet-Sâncraiu	Forţ Radu -Rogojel	Gligan Adina-Râşca	Tomoş Ioan-Râsca	Râşca	Râşca
2	Török Boglarka-Sâncraiu	Tomoş Daniel-Râşca	Todoruţ Ioana-Răchiţele	Răşinar Valentin-Răchiţele	Rogojel	Rogojel
3	Giurgiu Carmen-Beliş	Iancu Andrei-Măguri Răcătău	Trif Cristina-Beliş	Potra Ioan-Răchiţele	Sâncraiu	Răchiţele

Prof. ed. fizică: Anghel Todea
Director: Mihaela Mocean
Primar: Viorel Crainic
Viceprimar: Mariana Ciumăfaie
Salvamont - organizare şi asistenţă: Dorin Potra

3. Centrul Mărişel - Cupa *Pelaghia Roşu,* ediţia a XXX-a, 6 februarie 2016

Loc	Fete 11-12 ani	Băieţi 11-12 ani	Fete 13-14 ani	Băieţi 13-14 ani	Ştafetă	Clasament echipe
1	Török Bogláka-Sâncraiu	Matiş Sebastian-Beliş	Gligan Adina-Râşca	Potra Ioan-Răchiţele	Râşca	Râşca
2	Abrudan Alina-Mărişel	Vâtcă Claudiu-Râşca	Todoruţ Ioana-Răchiţele	Tomoş Ioan-Râşca	Mărişel	Răchiţele
3	Berindei Andreea-Măguri-Bogdăneşti	Mariş Sebastian-Măguri-Bogdăneşti	György Erzesebet-Sâncraiu	Safta Claudiu-Mărişel	Sâncraiu	Rogojel

Prof. ed. fizică: Sorin Brăileanu
Director: Prof. Dana Feneşan
Primar: Traian Mariş
Salvamont: Dorin Potra

4. Centrul Râşca - Cupa *Sălănducu,* ediţia a XVIII-a, 13 februarie 2016

Loc	Fete 11-12 ani	Băieţi 11-12 ani	Fete 13-14 ani	Băieţi 13-14 ani	Ştafetă	Clasament echipe
1	Matiş Larisa-Mărişel	Tomoş Daniel-Râşca	Gligan Adina-Râşca	Răşinar Valentin-Răchiţele	Râşca	Râşca
2	Giurgiu Carmen-Beliş	Forţ Radu-Rogojel	Todoruţ Ioana-Răchiţele	Tomoş Ioan-Râşca	Răchiţele	Rogojel
3	Abrudan Alina-Mărişel	Todoruţ Pavel-Răchiţele	Trif Cristina-Beliş	Lăpuşte Andrei-Râşca	Rogojel	Răchiţele

Prof. ed. fizică: Ardelean Ilea - organizare
Director: Prof. Florin Cociş
Primar: Ioan Morar
Viceprimar: Traian Matiş
Salvamont: Dorin Potra

5. Centrul Băişoara - Cupa *Micii vânători de munte,* ediţia a XXXVII-a, 21 februarie 2016

Loc	Fete 11-12 ani	Băieţi 11-12 ani	Fete 13-14 ani	Băieţi 13-14 ani	Ştafetă	Clasament
1	Marton Anette-Sâncraiu	Tomoş Daniel-Râşca	Gligan Adina-Râşca	Safta Claudiu-Mărişel	Râşca	Râşca
2	Mariş Larisa-Mărişel	Forţ Radu-Rogojel	Trif Cristina-Beliş	Tomoş Ioan-Râşca	Beliş	Mărişel
3	Török Boglarka-Sâncraiu	Matiş Sebastian-Beliş	György Erzsebet-Sâncraiu	Răşinar Valentin-Răchiţele	Rogojel	Rogojel

Organizatori: ISJ Cluj, Pof. Cristian Potora- Inspector şcolar - ed. fizică
Director: Prof. Monica Horodinca-Palatul copiilor Cluj
Director de concurs: Prof. Mircea Elecheş-coordonatorul Comisiei tehnice şi de arbitraj.

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The Vlădeasa Cup, Rogojel; waiting for the start.

Prize award ceremony conducted by Prof. Aurel Dan Crişan and Director Mariana Paşcalău. The Vlădeasa Cup, Rogojel.

The Vlădeasa Cup, Rogojel. Start of the 11-12 year old girls' event.

The Scoruşet Cup, Beliş; a competitor on the ski track.

The Scoruşet Cup, Beliş; arrival of a competitor.

The Scoruşet Cup, Beliş. The round counting point.

The enthusiastic Director of the School in Mărişel, Mirela-Dana Feneşan, during the award ceremony. In the background: School Inspector Laura Ionescu and Deputy School Inspectors Török Zoltán and Mariana Pop. Mayor Traian Mariş, first to the right.

The Pelaghia Roşu Cup, Mărişel. The youngest competitor ready to start - Török Zalán, Izvorul Crişului, Sâncraiu commune.

The Pelaghia Roşu Cup, Mărişel – 1st place in the 11-12 year old girls' event - Török Boglárka, Izvorul Crişului, Sâncraiu commune. The prize is handed by Deputy General School Inspector Mariana Pop.

The Pelaghia Roşu Cup, Mărişel – 1st place in the 13-14 year old girls' event - Gligan Adina-Râşca. The prize is handed by Inspector Cristian Potora.

Award ceremony in Râşca, the Sălănducu Cup: the organizing professor - Prof. Ardelean Ilea (right) and the school Director Prof. Florin Cociş (left).

The Sălănducu Cup, Râşca – 1st place in the 11-12 year old girls' event, Matiş Larisa-Mărişel. Award ceremony conducted by Prof. Ramona Ilea.

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; psychoneuroendocrinology 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 Universitary 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 adress 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. Educaţie Fizică şi 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

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Editor: "Iuliu Haţieganu" 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

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ÎN ATENŢIA COLABORATORILOR

Tematica revistei

Ca tematică, revista are un caracter multidisciplinar orientat pe domeniile biomedical, sănătate, efort fizic, ştiinţe sociale, aplicate la activităţile de educaţie fizică şi sport, astfel încât subiectele tratate şi autorii aparţin mai multor specialităţi din aceste domenii. Principalele rubrici sunt: „Articole originale" şi „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 şi riscuri; determinanţi emoţionali ai performanţei; recuperarea pacienţilor cu suferinţe ale coloanei vertebrale; sindroame de stres şi psihosomatică; educaţia olimpică, aspecte juridice ale sportului; efortul fizic la vârstnici; tulburări ale psihomotricităţii; pregătirea sportivă la altitudine; fitness; biomecanica mişcărilor; testele EUROFIT şi alte metode de evaluare a efortului fizic; reacţii adverse ale eforturilor; endocrinologie sportivă; depresia la sportivi; dopajul clasic şi genetic; Jocurile Olimpice etc.

Dintre articolele consacrate studiilor şi cercetărilor experimentale notăm pe cele care vizează: metodica educaţiei fizice şi sportului; influenţa unor ioni asupra capacităţii de efort; profilul psihologic al studentului la educaţie fizică; metodica în gimnastica sportivă; selecţia sportivilor de performanţă.

Alte articole tratează teme particulare vizând diferite sporturi: înotul, gimnastica ritmică şi artistică, handbalul, voleiul, baschetul, atletismul, schiul, fotbalul, tenisul de masă şi câmp, luptele libere, sumo.

Autorii celor două rubrici de mai sus sunt medici, profesori şi educatori din învăţământul universitar şi preuniversitar, antrenori, cercetători ştiinţifici etc.

Alte rubrici ale revistei sunt: editorialul, actualităţile editoriale, recenziile unor cărţi - ultimele publicate în domeniu, la care se adaugă şi altele prezentate mai rar (invenţii şi inovaţii, universitaria, preuniversitaria, forum, remember, calendar competiţional, portrete, evenimente ştiinţifice).

Subliniem rubrica "Memoria ochiului fotografic", unde se prezintă fotografii, unele foarte rare, ale sportivilor din trecut şi prezent.

De menţionat articolele semnate de autori din Republica Moldova privind organizarea învăţământului sportiv, variabilitatea ritmului cardiac, etapele adaptării la efort, articole ale unor autori din Franţa, Portugalia, Canada.

Scopul principal al revistei îl constituie valorificarea rezultatelor activităţilor de cercetare precum şi informarea permanentă şi actuală a specialiştilor din domeniile amintite. Revista îşi asumă şi un rol important în îndeplinirea punctajelor necesare cadrelor didactice din învăţământul universitar şi preuniversitar precum şi medicilor din reţeaua medicală (prin recunoaşterea revistei de către Colegiul Medicilor din România), în avansarea didactică şi profesională.

Un alt merit al revistei este publicarea obligatorie a cuprinsului şi a câte unui rezumat în limba engleză, pentru toate articolele. Frecvent sunt publicate articole în extenso într-o limbă de circulaţie internaţională (engleză, franceză).

Revista este publicată trimestrial iar lucrările sunt acceptate pentru publicare în limba română şi 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) şi listate, prin poştă pe adresa redacţiei. Lucrările colaboratorilor rezidenţi în străinătate şi ale autorilor români trebuie expediate pe adresa redacţiei:

Revista «Palestrica Mileniului III»
Redactor şef: Prof. dr. Traian Bocu
Adresa de contact: palestrica@gmail.com sau traian_bocu@yahoo.com
Adresa poştală: 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 activităţii de cercetare a colaboratorilor săi, în special prin stimularea participării acestora la competiţii de proiecte. Menţionăm că articolele publicate în cadrul revistei sunt luate în considerare în procesul de promovare în cariera universitară (acreditare obţinută în urma consultării Consiliului Naţional de Atestare a Titlurilor şi Diplomelor Universitare).

Ne propunem de asemenea să încurajăm publicarea de studii şi cercetări, care să cuprindă elemente originale relevante mai ales de către tineri. Toate articolele vor trebui să aducă un minimum de contribuţie personală (teoretică sau practică), care să fie evidenţiată în cadrul articolului.

În perspectivă ne propunem îndeplinirea criteriilor care să permită promovarea revistei la niveluri superioare cu recunoaştere internaţională.

STRUCTURA ŞI TRIMITEREA ARTICOLELOR

Manuscrisul trebuie pregătit în acord cu prevederile Comitetului Internaţional 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.

Ilustraţiile:

Figurile (grafice, fotografii etc.) vor fi numerotate consecutiv în text, cu cifre arabe. Vor fi editate cu programul EXCEL sau SPSS, şi vor fi trimise ca fişiere separate: „figura 1.tif", „figura 2. jpg", iar la solicitarea redacţiei şi în original. Fiecare grafic va avea o legendă care se trece **sub** figura respectivă.

Tabelele vor fi numerotate consecutiv în text, cu cifre romane, şi vor fi trimise ca fişiere separate, însoţite 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 instituţiei, adresa poştală şi 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 consacraţi). Toate articolele vor avea un rezumat în limba engleză. Nu se vor folosi prescurtări, note de subsol sau referinţe.

Premize şi obiective: descrierea importanţei studiului şi precizarea premizelor şi obiectivelor cercetării.

Metodele: includ următoarele aspecte ale studiului:

Descrierea categoriei de bază a studiului: de orientare sau aplicativ.

Localizarea şi perioada de desfăşurare a studiului. Colaboratorii vor prezenta descrierea şi mărimea loturilor, sexul (genul), vârsta şi alte variabile socio-demografice.

Metodele şi instrumentele de investigaţie folosite.

Rezultatele vor prezenta datele statistice descriptive şi inferenţiale obţinute (cu precizarea testelor statistice folosite): diferenţele dintre măsurătoarea iniţială şi cea finală, pentru parametri investigaţi, semnificaţia coeficienţilor de corelaţie. Este obligatorie precizarea nivelului de semnificaţie (valoarea ***p*** sau mărimea efectului ***d***) şi a testului statistic folosit etc.

Concluziile care au directă legătură cu studiul prezentat.

Articolele de orientare şi 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 şi Metode (inclusiv informaţiile etice şi statistice), Rezultate, Discutarea rezultatelor, Concluzii (şi 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 menţiona: numele tuturor autorilor şi iniţialele prenumelui, anul apariţiei, titlul articolului în limba originală, titlul revistei în prescurtare internaţională (caractere italice), numărul volumului, paginile

Articole: Pop M, Albu VR, Vişan D et al. Probleme de pedagogie în sport. Educaţia Fizică şi Sportul 2000; 25(4):2-8.

Cărţi: Drăgan I (coord.). Medicina sportivă aplicată. Ed. Editis, Bucureşti 1994, 372-375.

Capitole din cărţi: Hăulică I, Bălţatu O. Fiziologia senescenţei. În: Hăulică I. (sub red.) Fiziologia umană. Ed. Medicală, Bucureşti 1996, 931-947.

Începând cu revista 4/2010, fiecare articol va trebui să se bazeze pe un minimum de 15 şi un maximum de 100 referinţe bibliografice, în majoritate articole nu mai vechi de 10 ani. Sunt admise un număr limitat de cărţi şi articole de referinţă (1-3), cu o vechime mai mare de 10 ani. Un procent de 20% din referinţele bibliografice citate trebuie să menţioneze literatură străină studiată, cu respectarea criteriului actualităţii acesteia (nu mai vechi de 10 ani).

Procesul de recenzare (peer-review)

Într-o primă etapă toate materialele sunt revizuite riguros de cel puţin doi referenţi competenţi în domeniu respectiv (profesori universitari doctori şi doctori docenţi) pentru ca textele să corespundă ca fond şi formă de prezentare cerinţelor unei reviste serioase. După această etapă materialele sunt expediate referenţilor revistei, în funcţie de profilul materialelor. În urma observaţiilor primite din partea referenţilor, redacţia comunică observaţiile autorilor în vederea corectării acestora şi încadrării în cerinţele de publicare impuse de revistă. Acest proces (de la primirea articolului până la transmiterea observaţiilor) durează aproximativ 4 săptămâni. Cu această ocazie se comunică autorului daca articolul a fost acceptat spre publicare sau nu. În situaţia acceptării, urmează perioada de corectare a articolului de către autor în vederea încadrării în criteriile de publicare.

Conflicte de interese

Se cere autorilor să menţioneze toate posibilele conflicte de interese incluzând relaţiile financiare şi de alte tipuri. Dacă sunteţi siguri că nu există nici un conflict de interese vă rugăm să menţionaţi acest lucru. Sursele de finanţare ar trebui să

fie menţionate în lucrarea dumneavoastră.

Precizări

Precizările trebuie făcute doar în legătură cu persoanele din afara studiului, care au avut o contribuţie substanţială la studiul respectiv, cum ar fi anumite prelucrări statistice sau revizuirea textului în limba engleză. Autorii au responsabilitatea de a obţine permisiunea scrisă din partea persoanelor menţionate cu numele în cadrul acestui capitol, în caz că cititorii se referă la interpretarea rezultatelor şi concluziilor acestor persoane. De asemenea, la acest capitol se vor face precizări în cazul în care articolul valorifică rezultate parţiale din anumite proiecte sau dacă acesta se bazează pe teze de masterat sau doctorat susţinute de autor, alte precizări.

Criterii deontologice

Redacţia va răspunde în timp util autorilor privind acceptarea, neacceptarea sau necesitatea modificării textului şi îşi 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 redacţiei odată cu articolul propus spre publicare, într-un fişier word separat, o declaraţie scrisă în acest sens, cu angajamentul respectării normelor deontologice referitoare la citarea surselor pentru materialele folosite (referinţe bibliografice, figuri, tabele, chestionare).

Pentru articolele originale, în conformitate cu îndeplinirea condiţiilor Declaraţiei de la Helsinki, a Protocolului de la Amsterdam, a Directivei 86/609/EEC şi a reglementărilor Comisiilor de Bioetică din locaţiile unde s-au efectuat studiile, autorii trebuie să prezinte:

- acordul informat din partea familiei, pentru studiile pe copii şi juniori;
- acordul informat din partea subiecţilor adulţi, pacienţi şi sportivi, pentru participare;
- adeverinţă de Malpraxis pentru medici, pentru cercetările/studiile pe subiecţi umani;
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Datele vor fi menţionate în articol la secţiunea Material şi metodă. Documentele vot fi obţinute înainte de începerea studiului. Se va menţiona şi numărul de înregistrare al adeverinţei din partea Comisiilor de Etică.

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