Welcome
To

The 2nd Serbian International Sports Medicine Conference

NEW DIMENSION IN SPORTS MEDICINE

BOOK OF ABSTRACTS

May 23– 25, 2019

Sava Center, Belgrade
Republic of Serbia

Under the auspices
of

Република Србија
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The 2nd Serbian International Sports Medicine Conference

NEW DIMENSION IN SPORTS MEDICINE

PRE - CONFERENCE EVENT

SPORT AND EXERCISE CARDIOLOGY COURSE

Program

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SPORT AND EXERCISE CARDIOLOGY COURSE FIMS

INTERNATIONAL FEDERATION OF SPORTS MEDICINE
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Sport and Exercise Cardiology Course is accredited by the Health Council of Serbia under the number A-1-447 / 19 for doctors, biochemists, nurses, medical technicians with 6 points for passive participation.

SPORT AND EXERCISE CARDIOLOGY COURSE DAY 1
22nd May 2019

7.30 – 8.00	Registration	
8.00 – 8.10	Welcome and introduction	

Time	Topic	Lecturer
8.10 – 8.45	Sport and Exercise Cardiology – the need, and the role of the healthcare provider	Dragan Radovanović
8.45 – 9.20	Cardiac physiology	Vladimir Jakovljević
9.20 – 10.00	Preparticipation cardiovascular examination in pediatric sports medicine	Sergej Prijić
10.00 – 10.15	The role of magnesium	Danijela Tasić
10.15 – 10.30	Break – Morning tea	
10.30 – 12.00	Cardiac pathology of relevance to sports – symptomatic and asymptomatic	
	Cardiac arrhythmias in young athletes	Goran Vukomanović
	Myocarditis in athletes – diagnostic, treatment and recommendation for physical activity	Vladislav Vukomanović
12.00 – 12.40	Congenital heart diseases and sports activities	Vojislav Parezanović
12.40 – 14.00	Break – Lunch	

Time	Topic	Lecturer
14.00 – 14.35	Cardiac medication – effect on exercise, exercise effect on action of medication; doping considerations	Nenad Dikić
14.35 – 15.55	Diagnostic in cardiology	
	Ultrasound in cardiologic diagnosis	Ana Djordjević Dikić
	Cardiac magnetic resonance imaging in risk stratification of sudden cardiac death in athletes	Marija Zdravković
15.55 – 16.30	The collapsed athlete – considering non cardiac causes and co – morbidities	Branislav Milovanović

SPORT AND EXERCISE CARDIOLOGY – THE NEED, AND THE ROLE OF THE HEALTHCARE PROVIDER

Dragan Radovanović

Faculty of Sport and Physical Education University of Niš, Niš, Republic of Serbia

Abstract

Medical follow-up of athletes and physically active individuals is a complex process, requiring collaboration and adjustment of activity between physicians, coaches, strength and conditioning experts, psychologists, physical therapists and nutritionists. It is expected from physicians to make medical decisions in the best interest of athletes/physically active individuals, including the contribution of the multidisciplinary team and the athlete himself. The doctor's role usually begins with a pre-participation evaluation (detailed history, physical examination, and testing as needed), followed by decision-making about the actual participation or return to the training/competition process. A proper interpretation of the obtained clinical data requires thorough understanding of sports and exercise physiology and numerous adaptive cardiovascular changes. Specific approaches in the evaluation of athletes/ physically active individuals are necessary because of electrocardiographic variations, ergospirometric testing, specific cardiac pathology, use of medication in the light of frequent changes to the WADA Prohibited List, etc. As an integral part of continued professional training of physicians, it is necessary to update one's knowledge of the recommendations for training/pre-participation evaluation in pediatric populations and the elderly. In recent years, the use of technologically advanced heart frequency monitors for the purpose of exercise workload dosing has led to relatively frequent findings of surprisingly high heart frequency values and/or false arrhythmias, causing the sense of fear and reduction or interruption of physical activity, with unnecessary, time-consuming or expensive medical diagnosis. In the future, the approaches should be agreed upon which would lead to as effective as possible evaluation of health of athletes/physically active individuals, minimizing at the same time needless restrictions of involvement in the process of training/competition, and inadequate or overtreatment.

PREPARTICIPATION CARDIOVASCULAR EXAMINATION IN PEDIATRIC SPORTS MEDICINE

**Sergej Prijić, Vladislav Vukomanović,
Jovan Košutić, Sanja Ninić, Saša Popović**

School of Medicine University of Belgrade, Belgrade, Republic of Serbia

Abstract

Sport activity has beneficial impact on physical and mental health, but in children with heart disease is associated with higher risk of decompensation and sudden cardiac death. Cardiovascular diseases are the most important cause of sudden death in athletes (>90%) with the annual incidence of 2.3 per 100000 in population between 12 and 35 years, which is 2.5 times more frequent compared to general population. Preparticipation cardiovasular screening includes medical history, clinical and ECG examination. Considering the fact that sport activities lead to cardiac structural, functional and electrical changes, the aim of this screening is to enable recognition of the heart disease which can be worsened during physical activity. The recommandations for competitive sports participation are based on the assessment of risk-benefit ratio. Children and young adults with cardiovascular disease presumably invulnerable to physical effort are allowed to take part in competitive sports. However, the variety and complexity of cardiovascular disease in children demand individual risk analysis in patients with congenital heart defects, acquired valvular disease, cardiomyopathies, myocarditis, pericarditis, arterial hypertension, ischemical heart disease, arrhythmias and arrhythmogenic conditions. Preparticipation cardiovasular screening which includes ECG examination can reduce the risk of sudden cardiac death to 0.4 per 100000 per year.

MYOCARDITIS IN ATHLETES - DIAGNOSIS, TREATMENT AND RECOMMENDATIONS FOR PHYSICAL ACTIVITY

Vladislav Vukomanović

Mother and Child Health Care Institute of Serbia Dr Vukan Čupić, Belgrade, Republic of Serbia

Abstract

Myocarditis is an acute or chronic inflammatory myocardial disease, viral, post infective immune- or primarily organ-specific etiology. Acute myocarditis (AM) is classifiedas common myocarditis and fulminant. Chronic myocarditis (CM) is divided into chronic active and chronic persistent. Coxackievirus B3 (CBV3) is considered to be a dominant etiological factor, while other commonly detected viral genomes are enterovirus, adenovirus, parvovirus B19 (PVB19), human herpes virus 6 (HHV6) and Epstein-Barr virus (EBV). The gold standard for diagnosis of myocarditis is based on Dallas criteria. However, recent reports about the role of inflammatory changes in myocardium increase the interest in the magnetic resonance (MR).MR allows insight into heart morphology, a safe evaluation of functional parameters and more significantly, the possibility of tissue characterization. Early diagnosis and determination of specific etiology directly affects the morbidity and mortality in patients with AM and CM.

Myocarditis is the cause of pervasive cardiac death (SD) in 20% of young people, which usually occurs during exercise. Exercise increases the risk for SD by 45% for Coxackie myocarditis. Studies have shown that there is an unequivocal effect of physical strain on the immune system. During severe physical effort, stress hormones are released, which leads to a reduction in number and functional capacity of the leukocytes. Hormonal changes during exercise and release of adrenaline, cortisol, STH and prolactin have an immunomodulatory effect. Also, the systemic level of IL-6 is increased during effort. Therefore, it appearsthat the reason for increase in incidence of infec-

tions in athletes is multifactorial, caused by various physical, psychosocial and nutritive stressors, as well as environments that work to reduce immune function in athletes and make them more susceptible to infection.

Current guideline in United States recommends that athletes with possible or proven myocarditis should not participate in competitive sports while there are signs of inflammation, regardless of age, sex or function of the left ventricle.

According to the recommendations of the American Association (AHA), competition activities should not be started at least 3 to 6 months after AM, while the European Association advises a 6-month restriction.

It is not recommended to actively engage in sports the athletes with myocardial fibrosis confirmed by MR because of increased risks of SD and arrhythmias.

If an athlete wants to return to competitive activities, the recommendations are ensured by continuous monitoring and evaluation of ECG, MR, 24h Holter monitoring, echo and stress test.

CONGENITAL HEART DISEASES AND SPORTS ACTIVITIES

Vojislav Parezanović

Faculty of Medicine, University of Belgrade, head of Cardiology Department, University Children's Hospital, Belgrade, Republic of Serbia

Abstract

Congenital heart diseases (CHD) are the most common significant congenital anomalies with incidence of 0,8%. All children have a natural need to move, play and perform activities. Exercise is necessary for an optimal physical, emotional and psychosocial development for healthy children as well as children with CHD.

The aim of this lecture is to review current recommendations regarding participation of children and adolescent with CHD in competitive sports activities.

This review is based on eligibility and disqualification recommendations for competitive athletes with cardiovascular abnormalities recommendations by AHA (from 2015) and recommendations for physical activity, recreation sport, and exercise training in pediatric patients with congenital heart disease by AEPC (from 2012). Both recommendations are based upon type and severity of certain CHD, type of physical activities (leisure or competitive sport) and type of sports intensity based on peak dynamic and static components classification.

Every child with CHD can participate in some kind of physical activities and should be encouraged to do it regularly, but the most important issue is to estimate those children with CHD who participate in competitive sports activities. This estimation should be done by experienced pediatric cardiologist who should perform the complete examination including: medical history taking, clinical examination, ECG, echocardiography, exercise test and, in some situation, 24h ECG Holter monitoring and cardiac MR.

After complete cardiac evaluation, pediatric cardiologist should

give a written conclusion regarding the eligibility for type and intensity of sport competition as well as recommendations for check-up intervals and type of suggested investigations.

CARDIAC MEDICATION - EFFECT ON EXERCISE, EXERCISE EFFECT ON ACTION OF MEDICATION; DOPING CONSIDERATIONS

Marija Andjelković[1,3], Nenad Dikić[1,2] , Ivana Nedeljković[4]

Antidoping agency of Serbia[1], Faculty of Physical Education and Sports Management, Singidunum University[2], College of Sports and Health, Belgrade[3], Clinic of Cardiology, Clinical Center of Serbia, Medical Faculty, University of Belgrade[4]

Abstract

A large number of drugs can affect the exercise. The frequency of taking medication in patients undergoing exercise is difficult to determine. However, doctors should consider that the cause of the pathological finding on the exercise may be the active substance in the drug that the patient uses. In order to easily understand the substances that patients take, we can divide them into medicines, dietary supplements and doping or forbidden substances.

The largest share in drug consumption belongs to cardiovascular drugs (43.15%). then hematological drugs (17%), and on the third place neurological drugs (13%) (ALIMS, 2011). Similar data for dietary supplements is not impossible to obtain, due to the fact that the market is not controlled in the same way. Although dietary supplements can be purchased in pharmacies, a significant percentage is also coming through dealers, and from a black market. The third group of agents that can influence exercise are substances from the Prohibited List officially published every year in the State Official Gazette after the World Anti-Doping Agency (WADA) adopts and Anti-Doping Agency of the Republic of Serbia confirms the List (ADAS).

There are several basic mechanisms in which active substances from drugs and supplements can affect the exercise:

1. Vasodilation and vasoconstriction
2. Inotropic effect

3. Chronotropic effect and
4. Proarrhythmic effect. Special action exists at the so-called cardiotoxic drugs in which all four mechanisms can be combined.

Instead of the conclusion, it should be said that every doctor should know that:

1. When person is exercising with unexpected cardiac symptoms, it should always be suspected of the abuse of medication, supplements or Prohibited Substances,
2. The patient should always be asked for the medicines and supplements they use,
3. Cardiovascular adverse effects of doping agents are not rare and may be fatal during exercise,
4. Doctor plays a key role in preventing negative effects and use of prohibited substances.

ULTRASOUND IN CARDIOLOGIC DIAGNOSIS

Ana Djordjević Dikić

Cardiology Clinic, KCS, Medical School, University of Belgrade

Abstract

The effect of regular exercise training and participation in competitive sport on the heart is reflected in physiologic remodeling known as "The athlete's heart".

However, some conditions, ECG changes or physical findings could indicate the changes in the heart that are beyond this physical adaptation.

The most informative, available and diagnostically accurate imaging "first line" method is cardiovascular ultrasound, today also with more sensitive, sophisticated analysis such as strain imaging.

Individualized approach is very important in evaluation, since the absolute values of the left ventricle dimensions should be viewed in the contest of the body size, so indexing structural and functional parameters should be implemented.

Standard echocardiographic evaluation helps differentiate between hypertrophic cardiomyopathy and physiologic adaptation using upper limits of morphologic and functional parameters and in the presence of normal ejection fraction and stroke volume.

While left atrial enlargement could be found in large cohort of athletes, proportional to biventricular enlargement, but enlargement of aortic root should always raise suspicion of pathologic condition.

Exercise stress echocardiography is very reliable method to assess cardiac function, contractile reserve, arrhythmias, exercise capability and with ECG and clinical data contribute to detect cardiac abnormalities.

New echocardiographic techniques such as strain imaging, give us an insight in preclinical changes of the left ventricle simply by measuring global longitudinal strain., whose definition is longitudinal shorten-

ing of myocardial fibers, that is invisible to eye , but is the first sign of functional impairment. It is indicated in investigation of the hypertrophic and dilated cardiomyopathy and right ventricular dysfunction.

Special consideration deserves also valvular heart disease, most commonly mitral valve prolapse and bicuspid aortic valve that can be accurately investigate with echocardiography and particularly stress echocardiography that allows measurement of the gradient and valvular function during exercise.

Ultrasound diagnosis is the first line diagnostic method in suspicion of the cardiac pathology in athletes.

ELECTROCARDIOGRAM (ECG) - OF RELEVANCE TO SPORTS AND EXERCISE - BASIC REVIEW OF NORMAL; ABNORMAL

Vojislav Giga

Cardiology Clinic, Clinical Center of Serbia, Belgrade, Republic of Serbia

Abstract

Electrocardiogram represents a basic tool in pre-participation screening in athletes. First criteria for differentiation of normal and abnormal were introduced in 1998 by Corrado et al. A modern interpretation of ECG in athletes is based on ESC recommendation from 2010. Afterwards several modifications of ECG criteria were adopted, with the last of them presented in 2018 by Sharma et al. (International criteria). Proper interpretation of ECG in athletes should provide high sensitivity for the detection of the disease, on one hand, and high specificity to avoid unnecessary diagnostics and disqualification from sports on the other hand.

Several factors, such as age, gender, race, medications as well as physical activity, can influence ECG. Prolonged exercise leads to cardiac adaptation with enlarged chamber size and increased vagal tone that can be observed on surface ECG. The main issue in the interpretation of athletes ECG is to differentiate these training related changes from those that may suggest presence of potentially lethal disease.

Benign ECG changes that are common in athletes are sinus arrhythmia, sinus bradycardia, first degree AV block, early repolarization, incomplete right bundle branch block and isolated voltage criteria for left or ventricular hypertrophy. Recently two more conditions are included in this group, T wave inversion confined to V1-V4 in pre-pubertal athletes, and T wave inversion in V1-V4 proceeded by ST segment elevation and isolated right ventricular hypertrophy.

Uncommon ECG findings in athletes include: II and III degree AV block, complete LBBB and RBBB, T wave inversion, ST segment de-

pression, pathological Q waves, ventricular preexcitation, long and short QT, epsilon wave, repolarization abnormalities suggestive of channalopathies. Presence of these findings on surface ECG requires further detailed investigations including echocardiography, magnetic resonance imaging, coronary angiography, EP study as appropriate or disqualification from sports.

The last revision of ECG interpretation in athletes introduced a third group of changes, so called borderline changes. Borderline changes are left or right axis deviation, left and right atrial enlargement. If these changes are present in isolation they may be considered normal variants and athletes are eligible for sports.

It should be noted that even if initial evaluation of athletes with ECG abnormalities is normal regular follow up is needed since ECG abnormalities may precede overt clinical/imaging manifestation of the disease.

ECG is corner stone of pre-participation screening in young athletes that can prevent the occurrence of sudden cardiac death. According to Italian experience performing routine ECG in young athletes led to the significant decrease in incidence of sudden cardiac death that was even lower than in general young population.

ECG IN PREPARICIPATION SCREENING OF ATHLETES – CURRENT GUIDELINES AND DILEMMAS

Sanja Ninić

Cardiology department, Institute for mother and child health care of Serbia, Belgrade, Republic of Serbia

Abstract

The sudden cardiac death in young athlete is a cause for concern among both professionals and the general population leading to constant debates related to the most effectively ways of prevention such outcome. Unfortunately, the most effective screening model for athletes has not yet been established. The most important controversy about screening model relates to the inclusion ECG recording in the preparticipation screening. Despite the fact that the ECG has increased sensitivity in detecting certain diseases that can lead to a sudden fatal outcome, there are doubts about the high percentage of false positives findings, economic cost-effectiveness and medical infrastructure. The best way to improve the specificity of this diagnostic tool is through better distinguishing benign from pathological findings, which must be followed with appropriate education of practitioners with the aim of correct interpretation of ECG findings. Current recommendations for interpreting ECG findings in athletes, such as Settle and Refined criteria in a significant percentage increase its specificity and reduce the need for additional diagnostic tests. Despite the dilemmas about which debate is still ongoing among experts in sports cardiology, the addition of ECG to screening program practices has been implemented and recommended by a number of international organizations including the International Olympic Committee, the European Cardiology Association and the International Federation of Football Associations

SPORT AND EXERCISE CARDIOLOGY COURSE DAY 2

23rd May 2019

Time	Topic	Lecturer
8.00 – 9.15	Electrocardiogram (ECG) – of relevance to sports and exercise – basic review of normal; abnormal	Vojislav Giga
	ECG in preparticipation screening of athletes – current guidelines and dilemmas	Sanja Ninić
9.15 – 9.50	Exercise a cornerstone of cardiovascular prevention	Nebojša Tasić
9.50 – 11.00	Exercise for cardiac rehabilitation – CAD, Cardiomyopathy, arrhythmias	
	Ergometry and Ergospirometry	Ivana Nedeljković
	Rehabilitation in coronary artery disease and cardiomyopathies	Ivana Burazor
11.00 – 11.15	Break – Morning tea	
11.15 – 11.50	Case discussions	Milena Antić
11.50 – 12.25	Case discussions	Gordana Korolija Mrdjanov
12.25 – 12.55	Lunch	
12.55 – 13.30	Cardiac resuscitation in children – theory	Snežana Rsovac
13.30 – 14.05	Cardiac resuscitation – theory Adults	Nebojša Damjanović
14.05 – 14.50	Cardiac resuscitation	
14.50 – 15.20	MCQ examination and course evaluation	
15.20	Closure	

EXERCISE A CORNERSTONE OF CARDIOVASCULAR PREVENTION

Nebojša Tasić[1], Dalibor Dragišić[2], Danijela Tasić[1]

[1]Cardiovascular Institute Dedinje, Belgrade, Serbia
[2]University Hospital Centre Dr Dragiša Mišović – Dedinje, Belgrade, Serbia

Abstract

A physical inactivity is one of the five major risk factors (along with hypertension, hypercholesterolemia, smoking, and obesity) for cardiovascular disease. The relative risk of inactivity is similar to that of hypertension, hypercholesterolemia and smoking. Regular exercise has a favorable effect on many of the risk factors. Various studies have demonstrated that there is an inverse relationship between regular exercise and the risk of coronary heart disease, cardiac events and death. Benefits of regular exercise on cardiovascular risk factors are: increase in exercise tolerance, reduction in body weight, reduction in blood pressure, reduction in LDL and total cholesterol, increase in HDL cholesterol, increase in insulin sensitivity. The two main types of exercise are aerobic and anaerobic and their effects on the cardiovascular system differ. Evidence supports the beneficial effects of aerobic exercise on cardiovascular risk reduction. It is recommended at least 30 minutes of modest activity on most, preferably all, days of the week. Modest activity is defined as any activity that is similar in intensity to brisk walking at a rate of about 5 kilometers per hour. These activities can include any other form activity that is dynamic in nature and of similar intensity, such as cycling and swimming. HISPA program presents individualized and multidisciplinary approach in reducing cardiovascular risk. It includes a specific program of physical activity respectively of type, duration and frequency. The program has been developed in collaboration experts of physical education and medical experts. It is adjusted to patient's general status, feasibility, risk factors, comorbidities, and desire effect. Although the effect of an exercise program on any single risk factor may generally be small, the effect of continued, moderate exercise on overall cardiovascular risk, when combined with other lifestyle modifications (such as nutrition, smoking cessation, and medication use), can be significant.

ERGOMETRY AND ERGOSPIROMETRY

Ivana Nedeljković[1], Vojislav Giga[1], Nenad Dikić[1,2], I. Nikolic[3], Tamara Antic[2,3], Marija Andjelković[1,4], Marija Zdravković[2,5]

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Abstract

Ergospirometry (CPET) is en exercise stress test (ET) during which, in addition to classical ET parameters (12-channel ECG and arterial pressure measurements), expiratory gases (oxygen concentrations (O2) and carbon dioxide (CO2) production) are analyzed noninvasively. CPET provides integrated assessment of the cardiovascular, pulmonary and skeletal muscle systems, which are not adequately reflected through the measurement of individual organ system function at rest. CPET has a wide spectrum of clinical applications for evaluation of undiagnosed exercise tolerance and for objective determination of functional capacity and impairment. It reflects the maximal ability of a person to take in, transport and use oxygen and defines functional aerobic capacity. In addition to numerous indications current guidelines favor the application of the CPET and the prescribing of training and rehabilitation.

VO2max has become the preferred laboratory measure of cardiorespiratory fitness and is the most important measurement during functional exercise testing. In healthy people (trained and competitive athletes), a VO2 plateau occurs at near maximal exercise which has traditionally been used as VO2max - the maximal achievable level of oxidative metabolism involving large muscle groups. However, in clinical testing, a clear plateau may not be achieved before symptom limitation of exercise, and peak VO2 is often used as an estimate of VO2max.

Another parameter, the ventilatory anaerobic threshold (VAT), is an index of exercise capacity. During the exercise, anaerobic metabolism predominates inducing a significant increase in CO2 production. The VAT is a useful measure as work below this level encompasses most daily living activities. The ability to achieve the VAT can help distinguish cardiac and non-cardiac causes of exercise limitation and it is used in determination of the intensity for exercise training as part of comprehensive evidence based rehabilitation.

REHABILITATION IN CORONARY ARTERY DISEASE AND CARDIOMYOPATHIES

Ivana Burazor

Department for cardiac rehabilitation, Institute for rehabilitation, Belgrade, Republic of Serbia

Abstract

Exercise-based rehabilitation effectively increases life expectancy and suppresses hospitalization frequency in patients with cardiac disease. Clinical guidelines formulate how to prescribe exercise in various cardiac diseases separately (after: myocardial infarction, cardiac surgery, heart transplantation, heart failure etc.) with aim to assists the cardiologists how to select training modalities in clinical practice.

The ESC recommendations for heart failure (HF) from 2016 recommend exercise training regardless of ejection fraction to improve exercise capacity, quality of life, and reduction in hospitalizations due to HF.

Meanwhile, for many years, hypertrophic cardiomyopathy (HCM) was equivalent to exercise training limitation. In 2015 first results showed that the majority of HCM patients with moderate risk undergoing supervised physical training had improved physical performance and no significant adverse events were recorded. On the other hand, the dilated cardiomyopathy is the common type of cardiomyopathy, and its distinctive characteristic is the systolic dysfunction. Not many reports were issued about the efficacy of cardiac rehabilitation in patients with an advanced dilated cardiomyopathy until yet. The most described is positive effect of cardiac rehabilitation on ischemic cardiomyopathy after myocardial infarction as integrative part of secondary prevention program.

The identification of the patients at risk for a cardiac event's recurrence (ie, risk stratification) is central to formulating an appropriate medical, rehabilitative, and surgical strategy to prevent such a recurrence.

Cardiac rehabilitation services are, therefore, an effective and safe intervention. These services are undoubtedly an essential component of the contemporary treatment of patients with multiple presentations of coronary heart disease and heart failure

CARDIAC RESUSCITATION IN CHILDREN - THEORY

Snežana Rsovac

Chief of PICU and NICU at University Children's Hospital, Belgrade, Republic of Serbia

Abstract

Introduction: All guidelines on paediatric life support and cardiac resuscitation are based on these principles: (1) the incidence of cardiac arrest and injury in children is much lower than in adults; (2) the illnesses and pathophysiological responses of paediatric patients are specific; (3) many paediatric emergencies are managed primarily by providers who are not paediatric specialists and who have limited paediatric emergency medical experience.

Methods: This presentation is compilation of new guidelines on cardiopulmonal resuscitation in children. The American Heart Association (AHA) Emergency Cardiovascular Care Committee (ECC) began collaborating with other resuscitation councils throughout the world , for example European Resuscitation Council, via the International Liaison Committee on Resuscitation (ILCOR), in a formal international process to evaluate resuscitation science which resulted Consensus on Science with Treatment Recommendations (CoSTR). This process produsedin creation of new guidelines for 2015.

Results: The 2015 ILCOR process showe results which help paediatric experts on 21 different key questions relating to paediatric resuscitation. The topic areas that the paediatric CoSTR questions which were related to: pre-cardiac arrest care, basic life support care, advanced life support during cardiac arrest and post-resuscitation care. Also, many gaps in knowledge about paediatric resuscitation have been identified this round of the CoSTR process.

Conclusions: We present new guidelines for pediatric CA (cardiac arrest). We present the current knowledge of epidemiology, pathophysiology and treatment of CA relevant to pre-hospital and acute care health practitioners.

Key words: cardiac arrest, cardiopulmonal resuscitation, children

CARDIOPULMONARY RESUSCITATION

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Abstract

Cardiac arrest represents cessation of cardiac output, or interruption in the supply of oxygen to tissues and organs. The most sensitive organ is the brain, whose cells after 3-4 minutes in hypoxic conditions are subject to permanent damage.

Emergency first aid measures in patients in whom there was a sudden cessation of breathing and heart failure - cardiac arrest are called measures of cardiopulmonary resuscitation (CPR) or revival measures.

The aim of CPR is to maintain the life of the brain and other vital organs until the establishment of spontaneous breathing and heart rate, or until the intervention of professionals through the delivery of oxygen.

The highest percentage of survival of a person is in which the CPR is applied within the first 3-5 minutes of the loss of consciousness. In order for survival rates to be as high as possible it is important to have a plan of treatment in cases of cardiac arrest. The plan - the so-called chain of survival includes the early assessment of cardiac arrest, early CPR started, the early applied automatic external defibrillator and an early start of higher life support.

A key factor in increasing the survival rate is a higher degree of training of the general population, not just health workers because they are also the people who first come into contact with the victims.

The 2nd Serbian International Sports Medicine Conference

NEW DIMENSION IN SPORTS MEDICINE

GENERAL SCIENTIFIC PROGRAM

May 23– 25, 2019

Sava Center, Belgrade,
Republic of Serbia

PROGRAM CONFERENCE

Official Conference language: English
Simultaneous translation to Serbian language provided

Preconference events

Session 1: New Dimension in Sport Medicine

Session 2: Preparticipation Screening
Session 3: Sport Injuries, Preventive Program
Session 4: Sport Cardiology
Session 5: Key Notes Lecturers
Session 6: Sports Performance & Nutrition
Session 7: Health Promotion and Healthy Lifestyle Programs for All
Session 8: Doping in sport, supplements / TUE
Session 9: New technology in sport medicine
Session 10: FIFA panel
Poster Presentations

Parallel sessions:
Workshop A: Sport Injuries, Treatment and New Techniques
Workshop B: Sport Injuries, Treatment and New Techniques

Program

PRECONFERENCE EVENTS Thursday May 23rd 2019	
Place: Klub poslanika, Tolstojeva 2	
16.00 – 16.30	Opening Ceremony
16.30 – 18.00	Session 1: New dimension in sport medicine

Chairs: Zdeslav Milinkovic (Serbia)

Time	Topic	Lecturer
16.30 – 16.45	Past, present and future / sports medicine in Serbia	Zdeslav Milinković (Serbia)
16.45 – 17.00	FIMS Past, present and future	Fabio Pigozzi (FIMS)
17.00 – 17.15	What the team physician did not learn in the medical school	Mourad Ghrairi (UAE)
17.15 – 17.30	FIMS Past, present and future	Yannis Pitsiladis (FIMS)
17.30 – 17.45	Ministry of health	
17.45 – 18.00	Ministry of youth and sport	
18.00 – 19.00	Welcome drink	
19.00 – 21.00	Dinner	

FIMS PAST, PRESENT AND FUTURE

Pigozzi Fabio

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Abstract

Since its establishment in 1928, FIMS has been committed to the development of an active connection with the Olympic Movement and the philosophy and educational principles which inspired its founding father, Pierre de Coubertin (1863-1937). Thanks to FIMS, sports medicine has become a medical specialty internationally and has been allowed to develop both as a community of practitioners and scientists dedicated to defining its interdisciplinary field. FIMS is committed to make sport and physical activity a stronger part of individuals' life. For FIMS, well-being is a human right and sport is used by medicine to make this right accessible to all human beings. The continued investment in medical education and training by FIMS reflects its attention to the improvement of young generations of sports physicians. The history of FIMS is the story of people who have devoted their lives to medicine and its values and have used physical activity and sport to translate them into practice. This commitment and engagement have allowed the tremendous geographical expansion worldwide of the Federation and this presentation will show how FIMS, according to its manifesto, has supported, over the years, sports medicine in its evolution from the science of providing a "cure" for athletes that could enable them to perform safely in their best conditions , to a science also focused on sports practice as a tool to protect not only the health of athletes but also to promote the health of general population all over the world.

WHAT A TEAM DOCTOR DOES NOT LEARN AT MEDICAL SCHOOL

Mourad Ghrairi

Director of FIFA Medical Centre of Excellence, Dubai, UAE

Abstract

Most medical disciplines focus on treating a particular physical function or system. It is not the case of sports medicine which focuses on treating a group of individuals and all health concerns related to the exercise of their activity. It also takes into consideration the fact that athletes can be subject to developing the same conditions as other normally constituted human beings. This requires that those who practice sports medicine be able to master knowledge in a wide variety of medical fields such as general medicine, physiology, biology, psychology, nutrition, as well as to develop an understanding of the movement and functioning of the musculoskeletal system and conditions that may affect it. The complexity of this task is what sets sports medicine apart.

In spite of the particular aspect of this discipline, it is taught as a standalone specialty in some countries while others teach it merely as a sub-specialty. In either case the sports physician learns that his technico-medical role is to manage and prevent injuries, illnesses, emergencies, acclimatization and anti-doping issues as well to contribute in optimizing the athlete's performance. In addition, FIFA has created a football medicine diploma which is a free online course designed to help doctors to learn how to diagnose and manage common football related injuries and illnesses. This is meant to help reinforce the skills acquired in medical school. But there remains a certain part the team doctor's job that cannot be taught due to the rapidly evolving nature of the discipline as well as new technological advancements that influence athletic performance and recovery efforts.

The second aspect of the team doctor's job is rarely taught in medical schools around the world and it is what sets this profession apart.

Nowadays, and especially if he operates in the field of professional football, the team doctor needs to compose with the fact that he is working with a multi-disciplinary staff of physiotherapists, masseurs, nutritionists, psychologists, trainers, sport scientists etc... Communication between these various agents is key. For instance, in the case of an injury to a player, there must be a series of well-defined steps (from injury time until return to play) in transmitting information continuously and fluidly between the different agents responsible for the player's well-being and ending with a clear and unified message to the injured player, the head coach as well as to the club's management to avoid any confusion and to define the responsibility of each agent. Finally, the team doctor must also be savvy enough administratively to deal with the constraints imposed upon the team by insurance companies as well as keep up to date with the laws of the game such as anti-doping laws, concussion rules etc…

To conclude, as evidenced in this presentation, football medicine will always be a job learned on the job. It is indeed a dynamic and continuously evolving field requiring its practitioners to always be a step ahead when it comes to preserving the most important aspect of the sport which is the athlete's health. As Michelangelo appropriately declared at age 87, "Yet, I am learning."

Program

9.00 – 10.30	Session 2: Preparticipation screening

Chairs: Tamara Gavrilović (Serbia), Dragan Radovanović (Serbia) and Mats Borjesson (Sweden)

Time	Topic	Lecturer
9.00 – 9.20	Sudden cardiac death in competitive athletes and preparticipation screening	Fabio Pigozzi (Italy)
9.20 – 9.40	The new prescreening procedure for general population: decreasing the barriers to participation in physical activity	Dragan Radovanović (Serbia)
9.40 – 10.00	Screening of master athletes	Mats Borjesson (Sweden)
10.00 – 10.20	Importance of preventive screening of young athletes - SISSM experience	Tamara Gavrilović (Serbia)
10.20 – 10.30	Panel discussion and questions	
10.30 – 11.00	Coffee / Exhibition	

SUDDEN CARDIAC DEATH IN COMPETITIVE ATHLETES AND PREPARTICIPATION SCREENING

Pigozzi Fabio[1,2], Fossati Chiara[1].

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[2.] International Federation of Sports Medicine, Lausanne, Switzerland

Abstract

Sudden cardiac death (SCD) is a non traumatic, unexpected natural death of cardiac origin occurring within 1 hour from the onset of symptoms in a person who does not have a previously recognized cardiovascular condition that would appear fatal. Sports related SCD may occur during or immediately after the exertion involved in competition or training. Athletic field SCD is a dramatic event occurring in 1/100.000 to 1/300.000 per year in under 35 years old athletes, with an increasing risk for over 35 years old athletes (the incidence of SCD in >35 y ranges from 1/15.000 joggers to 1/50.000 marathon runners)[1].

A broad spectrum of cardiovascular abnormalities has been recognized as cause of sports related SCD. The lesions responsible for athletic field deaths differ considerably with regard to age. In fact, in over 35 years old athletes almost the 80% of SCDs are due to coronary artery disease1. On the other hand, in younger athletes a variety of congenital structural disease has been described. Among these diseases, the most common are Hypertrophic cardiomyopathy (the most frequent cause in U.S.A. where it accounts for about 1/3 of cases), Arrhythmogenic Rigth Ventricular Dysplasia (which represents the most frequent cause of SCD in Italy) and the congenital coronary arteries anomalies[2-3].

A number of other pathologic entities has been identified as cause of SCD in young athletes. Each of these causes is usually considered a minor cause, accounting for 5% or less of all the athletic field deaths. However, taken together, they cover about 40% of all cases and include

aortic rupture, generally in patients with Marfan syndrome, myocarditis, dilated cardiomyopathy and mitral valve prolapsed. Finally, in a small subset of young athletes who die suddenly (2-5%), no structural cardiac abnormalities can be detected at necropsy, also with an accurate hystologic examination. When extra-cardiac causes are excluded, most of these deaths in apparently normal heart are likely due to the "channelopathies", a group of primary electrical heart disease caused by mutations in genes encoding for cardiac ion channel proteins 2-3.

Although most of the athletes who die suddenly have never experienced cardiovascular symptoms before exitus, prodromal complaints (palpitation, chest pain, dizziness, weakness) have been described in many cases (20-54%)[4].

Another important subject that should be mentioned is the use of prohibited substances such as anabolic steroids, amphetamines, ephedrine, beta2-agonists, narcotics, that could cause cardiovascular adverse effect and therefore potentially determine SCD[5].

Pre-participation Screening (PPE) is the most important tool for preventing SCD in athletes. Different standards exist worldwide regarding the administration, content, format, and delivery of the PPE for sports. In June 2013, a joint consensus meeting was held in Indianapolis, Indiana to explore the issue of potentially standardizing a PPE for sports. While the panel did not reach consensus on electrocardiogram (ECG) screening as a routine part of PPE, all agreed that a history and physical exam focusing on cardiac risk is essential, and an ECG should be used where risk is increased[6]. In Italy 12-lead ECG at rest and after a submaximal 3 minute exercise (step test) is mandatory for eligibility in competitive sport activities. It should be noted that ECG abnormalities are commonly found in patients affected by potentially lethal cardiac disease, with the exception of those with congenital coronary anomalies[7].

Lastly, the final common pathway of SCD, independently from the specific cause, is generally a fatal ventricular arrhythmia (ventricular fibrillation) that causes cardiac arrest. For this reason, all members of the athletic staff should receive specific training in cardiopulmonary resuscitation (CPR) and use of external defibrillators. Indeed, the prompt recognition of cardiac arrest and the activation of cardiopulmonary resuscitation manoeuvres as well as the availability of an

automatic external defibrillation on the scene would be the real tool to avoid other future athletic field disasters.

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THE NEW PRESCREENING PROCEDURE FOR GENERAL POPULATION: DECREASING THE BARRIERS TO PATICIPATION IN PHYSICAL ACTIVITY

Dragan Radovanović

Faculty of Sport and Physical Education University of Niš, Republic of Serbia

Abstract

Physical inactivity is a global health issue that is vital for the primary prevention of most common, expensive and deadly chronic diseases. Exercise is an important component of the treatment and the role of health service providers in assessing and promoting physical activity is well established. The prescreening procedure carried out by a physician is considered to be the standard, generally required process for a clearance to participate in competitive sports at many levels (e.g.pediatric, adolescent, university and professional athletes). However, the prescreening procedure for general population participating in recreational sports or variety of fitness activities is generally not necessary, although they are at greater risk for complications and consequences associated with the interaction between physical activity or exercise, chronic conditions and orthopedic constraints. The new prescreening procedure for the general population highlights an important public health message of regular physical activity for all and seeks to eliminate unnecessary barriers to the adoption and maintenance of a well-structured exercise program and/or lifestyle that encompasses normal physical activity. The risk of exercise-related cardiovascular events is likely to be reduced by sticking to a safe and effective exercise prescription. Nevertheless, the risk of acute cardiovascular events related to exercise is greatest among ordinary sedentary people with known or occult cardiovascular diseases who perform an unaccustomed vigorous physical activity. However, the dangers of exercise-related cardiovascular events will probably be reduced by focusing on a safe and effective exercise prescription. It will take a coordinated effort of different segments of society to address physical inactivity as a public health problem. The new prescreening procedure for the general population aims to simplify the process by eliminating the need for medical examination and/or exercise testing in many individuals, especially when considering a low to moderate intensity exercise.

SCREENING OF MASTER ATHLETES"

Mats Borjesson

Center for Health and performance (CHP) and Inst of neuroscience and Physiology, Göteborg University and Sahlgrenska University Hospital/Östra, Goteborg, Sweden

Abstract

Master athletes are usually defined as athletes >35 years of age, but organized sporting competitions exist also for athetes considerably older, in sports such as running, cycling and marathon. While regular leisure-time physical activity is associated with decreased morbidity and mortality in cardiovascular disease (CVD), high-intensity sports is associated with increased risk of severe cardiac events (sudden cardiac arrest/death (SCA/SCD), especially in those with an underlying cardiovascular disease.

Cardiac screening strategies have been implemented in young athletes to identify individuals at risk (those having inherited/congenital heart disease) to prevent SCD. This strategy will not work in master athletes, where the leading cause of SCD is coronary artery disease (CAD).

A pragmatic approach to identify high-risk individuals was presented by the European Society of Cardiology (ESC) (Borjesson 2011), where participants in endurance races were recommended to self-assess their risk profile by using a simple questionnaire, PAR-Q. Those saying "yes" to any of the questions, were recommended to seek their regular doctor for advice on participation. Then, those having a high traditional risk-SCORE where recommended further testing, including a maximal exercise-test, before the decision on eligibility was made. Similar recommendations have now been tested in a study of the Ocean Race in Capetown, South Africa. The results showed that the use self-assessment at registration and education, was associated with a considerable reduction (29%) in medical events at the race (Schwellnus 2018). The results need to be confirmed in a larger, pro-

spective study. Such studies are now planned, through collaboration of multiple, international endurance races (million runner project).

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IMPORTANCE OF PREVENTIVE SCREENING OF YOUNG ATHLETES - SISSM EXPERIENCE

Tamara Gavrilović

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Abstract

In the past decade and even more, we spoke about importance of preparticipation screening in young athletes. Acording to Serbian law, preparticipation screening is obligatory in every 6 months for every single athlete, not just in competitive but also for everyone in recreative sport.

If we know the fact that regular intensive exercise in athletes might increases the relative risk of sudden cardiac death compared with sedentary population, then preparticipation screening can be very important in preventive diagnostic. In combination with specific questionnaires, clinical examination and analyse of 12 - lead ECG, it is most likely to recognize the potential threats.

What is the focus and most important part of this screening? Having in mind that ECG interpretation standards have undergone several modiffication, it was very important to improve our knowledge of detecting potentially life treatening cardiac conditions. It doesnt mean that focus of our attention during preventive screening is only to find cardiovascular risks, it just means that they can be the most important one, especially cause a large proportion of sudden cardiac death caused with arrhythmic syndrome in young athletes occurs during rest. Strategy of preventive examination can be to identify individuals with risk factors (congenital) or potential coronary artery disease (using different types of ergometry or ergospirometry protocols).

Following important international recommendations for ECG and interpretation guideline modification can be crucial in diagnostic, preventive screening and also for every single sports medical doctor a huge help in learning and recognize the difference between physiological ECG and potential pathology.

Program

11.00 – 13.00	Session 3: Sport injuries, preventive program

Chairs: Zdeslav Milinković (Serbia) and Demitri Constantinou (South Africa)

Time	Topic	Lecturer
11.00 – 11.20	Improving the health of the athlete: Load monitoring in high level professional cycling to prevent injury and illness	Jeroen Swart (South Africa)
11.20 – 11.40	New techniques in diagnostic and treatment	Demitri Constantinou (South Africa)
11.40 – 12.00	Evaluation of human movement dysfunction and injury risks factors	Predrag Božić (Serbia)
12.00 – 12.20	Development of A Model for Safe and Effective Return to Sports after Injuries	Rado Pišot (Slovenia)
12.20 – 12.40	Treatment of musculoskeletal system injuries in elite athletes and PRP & AdMSC method – case report	Aleksandar Jakovljević (Republic of Srpska)
12.40 – 12.50	Regenerative orthopedics in sport medicine	Dušan Marić (Serbia)
12.50 – 13.00	Panel discussion and questions	
12.30 – 13.45	Lunch / Exhibition	

IMPROVING THE HEALTH OF THE ATHLETE: LOAD MONITORING IN HIGH LEVEL PROFESSIONAL CYCLING TO PREVENT INJURY AND ILLNESS

Jeroen Swart

Director – Sports Medicine Academic Programme and Research Programme, University of Cape Town, Cape Town, South Africa

Abstract

The ability of the coach and sports scientist to delicately manipulate the athlete's training to allow for a positive response and adaptation to training may increase the likelihood of an optimal performance and reduce the risk of overuse injury or illness. Two seemingly identical athletes preparing for the same event might respond differently to the same training loads. Factors that may influence differences in the adaptive response include genetics, stress, quality of recovery and nutritional status.

The monitoring of training load in endurance sports, such as cycling, has been greatly assisted by the widespread availability of relatively affordable technologies which allow for measurement of distance, speed, gradient, acceleration, cadence, and power output.

Self-reported questionnaires are the preferred method of monitoring fatigue in high level sports while 61% of coaches and sports scientists make use of maximal, sub-maximal and sport-specific tests to monitor fatigue. The use of submaximal cycling-specific tests, such as the Lamberts and Lambert Submaximal Cycle Test (LSCT) incorporates a mix of variables (PO, HR and RPE) to assess the status of the autonomic nervous system and evaluate fatigue levels, and assess training status.

Cycling coaches or sports scientists can also make use of commercially available software, such as TrainingPeaks® to analyse the cycling performance against parameters established by the cyclist in previous training sessions. Parameters such as Training Stress Balance™ (TSB), Training Stress Score™ (TSS) are variables which have been introduced by TrainingPeaks® and are now widely used in the sport.

TrainingPeaks® also provide a platform to view the athlete's readiness to perform based on the recorded data in the form of a Performance Management Chart™ (PMC), thereby simplifying the presentation of training load in endurance sports.

Despite a number of recent studies which have validates TSS as a load metric in comparison to TRIMPS and power output (Sanders et al., 2017), to date there has been no research validating the use of the PMC to assess training status or fatigue.

Therefore a number of methods exist to quantify training status and fatigue and only some of these have been validated. A combination of submaximal, non-aversive internal and external load metrics used in conjunction may provide an accurate and practically useful tool to monitor fatigue in cycling.

We present data from a World Tour Professional Cycling team comparing the TrainingPeaks® PMC, a modified submaximal cycling test and an abbreviated subjective question set as a suitable method to monitor competitive cyclists.

NEW TECHNIQUES IN DIAGNOSTIC AND TREATMENT

Demitri Constantinou

Professor at University of the Witwatersrand, Faculty of Health Sciences, South Africa

Abstract

In the field of sports medicine, the diagnosis and treatment of sports injuries, (and illnesses), takes on a sense of urgency. Diagnoses must be accurate, management must be effective, and prevention is a key aspect. The presentation will look at new techniques in the diagnosis and management in the field of sports medicine. This will include diagnostic techniques such as imaging, wearable technologies, smart Apps, sports equipment, and treatments using advanced equipment and methods. Current and future trends of managing sports medicine will illustrate the need for sports physicians to always be updated, and potential pitfalls will be highlighted.

EVALUATION OF HUMAN MOVEMENT DYSFUNCTION AND INJURY RISK FACTORS

Predrag Božić

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Abstract

The evaluation human movement performance and injury risk factors have been based on isolated assessments of muscular strength and flexibility for a long period of time. One of the important shortcomings of the mentioned approach lies in the fact that the individual muscles or body segments do not work in isolation during movements. Therefore, examination of the isolated musculoskeletal capacities could be limited to assess the fundamental movement qualities related to human performance. Applying of fundamental movements patterns that incorporates the interplay between stability and mobility as well as the interactions between force production and force reduction could provide more appropriate evaluation of a person's potential injury risks and readiness to perform specific activities. Assessment abilities for performing more demanding activities (such as sport) require more demanding testing protocols (e.g. different loading conditions and greater level movement complexity) that underpin sport performance. Addition values in assessment of human movement function could be obtained also by evaluation of the movement coordinative variability or individual capacity to apply higher spectrum of coordinative strategies to achieve a movement outcome. Evaluation model that incorporates the analysis of fundamental and specific movement patterns, as well as movement coordinative variability, could optimize training and prevention / rehabilitation strategies focused on improving human movement function and reducing injury risk factors.

DEVELOPMENT OF A MODEL FOR SAFE AND EFFECTIVE RETURN TO SPORTS AFTER INJURIES

Rado Pišot[1,2], Uroš Marušič[1,3], Matej Kleva[1], Saša Pišot[1], Boštjan Šimunič[1]

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Abstract

Introduction: In previous studies, it has been repeatedly confirmed that intervention programs covering several risk factors associated with the occurrence of injury are at the same time most effective in limiting and preventing sports injuries (SI). But much less scientific data are available on injury prevention and prevention of recurred SI. SI are frequently correlated with previous injuries and often recurred because of several simultaneous injuries (de Visser et al., 2012) or due to maximal load after a previous injury (Creighton et al., 2012). As many as 37% of all SI are injuries of skeletal muscles yielding to the most important factor of out-of-play time in men's professional football. Teams of 25 players can expect 15 muscle SI for each season in which 90% of these injuries to the lower extremities (Ekstrand et al., 2011). To establish a model for safe and affective return to sport after injuries and appropriate preventive approaches it is important to identify the risk factors associated with the occurrence of an injury, considering various factors of the cause of injury (Hägglund et al., 2012). Ideally, it is necessary to search for and eliminate the factors for the injury, which is often excessive burden, muscle fatigue, muscular imbalance, insufficient force, weakened part of the body due to previous injuries etc. For the first time we will in the field of SI introduce the Tensiomyography (TMG), a non-invasive and selective tool for the assessment of skeletal muscle contractile properties. As a rec-

ommendation from former experiences, a FC Barcelona documented a Muscle Injuries Clinical Guide 3.0 that explicitly emphasizes the use of TMG for the follow-up of functional recovery of muscle and to help decide the return to play.

Methods. The ongoing research project aims to monitor SI epidemiology in Slovenian premium clubs in soccer (results presented in this abstract), basketball and gymnastics. Specifically, we are developing a thigh SI prediction model and explore factors of safe return to play. We monitored TMG of vastus laterali and medialis, rectus femoris, biceps femoris and semitendinosus of both legs; body characteristics (body height, mass and fat), motor tasks (strength endurance in hamstrings; whole body explosive power, flexibility of lower body). Additionally, we monitored perfectionism and life time events of athletes with prevalence of SI (Gotwals et al., 2012 and Petrie, 1992) and in the future measurements we intend to monitor also relationships between neurocognitive performance as an elevated risk of musculoskeletal injury (Herman et al., 2015). So far, we collected data from 267 football players from 10 clubs of the first Slovenian soccer league. A logistic regression modelling was used to estimate predictive value of assessed predictors.

Results: From May 2018 to May 2019 we collected 23 SI in the cohort of football players. Seventy-three percent of them occurred during the football game, others during the practice period. Forty-eight of them were skeletal muscle SI, 35% joints, 13% bone fracturs and 9% ligaments. Based on 11 thigh SI we could predict four (sensitivity 27%, specificity 99%). When predicting only 6 biceps femoris hamstring SI we could predict 4 (sensitivity 80%, specificity 100%). Prediction factors were based only from TMG parameters. It seems that the worst-case scenario for biceps femoris SI occurrence is short biceps femoris contraction time, high BF tone and low lateral symmetry. Interestingly, no significant predictors arose from body characteristics and motor tasks.

Conclusion: We emphasized high specificity and therefore sensitivity values are a bit low. But nevertheless 27% of all thigh SI and 80% of hamstring SI could be predicted. Although the number of SI is very low, we believe many more will be detected and there is a potential for valid SI prediction model in high-level soccer.

TREATMENT OF MUSCULOSCELETAL SYSTEM INJURIES IN ELITE ATHLETES AND PRP & ADMSC METHOD - CASE REPORT

Aleksandar Jakovljević, D. Jović, M. Jakovljević

Abstract

In this practice we show a few cases of treatment of elite athletes by using PRP (Platelets Rich Plasma) method and AdMSC (Adipose Mesenchimal Stem Cells).

In special hospital 'S.tetik' Banja Luka (Republic of Srpska,Bopsnia and herzegovina) and AMES'Sport Studio Banja Luka' we have done over 25 000 PRP aplications in last 8 years and 50 aplications of AsMSC in last 2 years. Our goal is to show just a few cases in top rated athletes treatments. All of them came to our facilities after being treated in other centers and countries. Outcomes haven't been satisfying so they came to our team.

Case 1: Basketball player, 27 years old, Euroleage player in Greek club - repeated ankle injury with persisting pain. MRI showed cartilage defect on on medial part his talar bone – 5 mm, swelling and signs of chronical inflammation of tarsal tunnel. Here, we treated his injury with PRP method, 3 doses 3 days apart, followed by 2 more doses after a month. At the same time he had physical therapy with Diacare, BFR and flossing. After 21 day the clinical report about his ankle has shown no swelling, full joint movement, subjectively no pain and full sports activity. A year after this he became an ABA League champion and 2 years after that a Euroleague champion.

Case 2: Goalkeeper, 33 years old – Knee injury, treated in medical center of Juventus, transferred to a Greek first league where he was also treated without success. Contract termination, followed by an operation in Germany, constant pain and limited movement. Arthroscopic report showed cartilage defect at femoral trochlea – 20x10mm. 6 months after arthroscopy he came to our center – 6 doses of PRP, physical treatment. 60 days after he went back on the field. MRI

showed defect of 10x10mm, full movement, subjectively improvement of 80%.

Case 3: Karate player, 22 years old. A week before European championship she had a knee injury, treated for 2 months in her hometown. No training, pain, limited movement. At our facility she got 3 doses of PRP 4 days apart and 2 more doses after 20 days, physical treatment included at the same time. She went back to training 20 days after the start of this treatment and 3 months after that she became a World champion.

Case 4.Teakwondoo World champion, 16 years old – knee injury with ACL rupture at a championship. MRI showed ACL rupture with minimal fiber preservation. AdMSC application with 3 doses of PRP, physical treatment (Active Tape, Tecar, BFR, flossing). 2 months after the injury her knee was stabile, isokinetics report showed complete rehabilitation of quadricepes. She went back to her training after 2 months and after 3 months to her full training routine. Subjectively without any problems and pain.

Case 5: Judoka, 22 years old – MCL injury at championship. MRI and Ultrasound showed total rupture of proximal junction of MCL. AdMSC application 5 days after injury, 2 doses of PRP 7 days apart, physical therapy, flossing, BFR. Back to judo after 6 weeks, gold medal at a Grand Prix exactly 90 days after this injury.

Conclusion: Based on more then 25 000 applications of Platelets Rich Plasma and 50 AdMSC procedures we can say that regenerative medicine is a great way of treating diseases, injuries and overuse syndromes at elite athletes. These methods aren't almighty, however they are a great choice at certain conditions where other therapy methods didn't give satisfying results. Complex clinical and laboratory, multicentric, prospective and retrospective studies will definitely give new dimensions to this part medical discipline, but based on the results that we have until now we can already say that they are good methods that have their own place in ordopedics and traumatology.

Key words: Elite athletes, Platelets Rich Plasma (PRP), AdMSC

REGENERATIVE ORTHOPEDICS IN SPORT MEDICINE

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Abstract

Sport medicine consist of variety of specific fields of activities. Regenerative orthopedics has certain inluence in everyday practice with active sportman.

Regenerative orthopedics can be divided in several fields

a) application of different types of platelet rich plasma

b) application of antiinflatory cytokine or autologous conditioned serum-mediated

c) stem cells and derivates

d) sensor motor supstitution with neuroplasticity

In this review we present our experience and possibilities of everyday approach to treatment of active athlete.

Program

14.00 – 16.15	Session 4: Sport Cardiology (Joint Session with Serbian Society of Cardiomagnetic Resonance)

Chairs: Marija Zdravković (Serbia) and Ivana Nedeljković (Serbia)

Time	Topic	Lecturer
14.00-14.20	MRI diagnostic	Marija Zdravković (Serbia)
14.20-14.40	The athlete with arrhythmias – risk stratification, sport eligibility and indications for PM/ICD s	David Niederseer (Switzerland)
14.40 – 15.00	Management of athletes with cardiovascular condition	Milena Antić (Serbia)
15.00 – 15.20	Exercising recommendations for paroxysmal AF in young and middle-aged athletes – PAFIYAMA syndrome	Ivana Nedeljković (Serbia)
15.20 – 15.40	Sudden cardiac death in young athletes	Vojislav Parezanović (Serbia)
15.40 – 16.00	Exercise induced arrhythmias in children and adolescents	Vladislav Vukomanović (Serbia)
16.00 – 16.15	Panel discussion and questions	
16.30 – 16.45	Coffee / Exhibition	

MRI DIAGNOSTIC

Marija Zdravković

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Abstract

Long-term exercise leads to structural and functional cardiac adaptation often termed „athlete's heart". Typical features include left ventricular hypertrophy (LVH), left ventricle (LV) and right ventricle (RV) cavity dilatation and associated electrocardiographic (ECG) and echocardiographic changes. In clinical practice, it can be challenging to differentiate the physiological changes of athlete's heart from cardiomyopathy. Novel cardiovascular magnetic resonance (CMR) techniques may be helpful for this purpose. Cardiomyopathies (arrhythmogenic right ventricular cardiomyopathy (ARVC), hypertrophic cardimiopathy (HCM), dilative cardiomyopathy, non-compacted cardiomyopathy), myocarditis, subendocardial ischemia are the leading causes of death in athletes. CMR, therefore, has a potentially vital role in improving diagnosis.

HCM is the leading cause of sudden cardiac death in young athletes worldwide. It is associated with mid wall fibrosis detected on LGE imaging predominantly in areas of hypertrophy and CMR is therefore very useful in making the diagnosis. The diagnosis of ARVC is based on "Task Force" criteria (TFC) of clinical, histological and electrophysiological and imaging parameters. CMR criteria require presence of both qualitative findings (RV regional akinesia, dyskinesia, dyssynchronous contraction) and quantitative metrics (decreased ejection fraction or increased indexed RV end-diastolic volume) and they have a sensitivity of 68 to 76%. On the other hand, a growing body of evidence has suggested that athletes' RV function is in fact superior to non-athletes. Non-compaction cardiomyopathy occurs due to an autosomally dominant inherited trait in which the middle and apical segments exhibit a thin compact wall with regional dilatation, dysfunction and significant hyper-trabeculation. There are dif-

ferent definitions including an end-diastolic ratio of non-compacted to compacted LV myocardium of greater than or equal to 2.3. Finally, the course of the coronary arteries in suspected coronary artery anomalies can be depicted by CMR either with or without administration of contrast.

Recent evidence suggests that prolonged participation in certain sports may predispose certain individuals to cardiac fibrosis, which may be associated with increased risk of arrhythmias, particularly atrial fibrillation. Hence, CMR can be very useful also in all this situations, where minucious analysis of the athlete heart is precious.

THE ATHLETE WITH ARRHYTHMIAS - RISK STRATIFICATION, SPORT ELIGIBILITY AND INDICATIONS FOR PM/ICDS

David Niederseer

Sports cardiology University Hospital, Department of Cardiology, Zurich, Suisse

Abstract

The competitive athlete is not immune to cardiac disease and cardiac arrhythmias are a major segment of cardiac diseases in athletes. They may occur in association with genetic ionic channel diseases, anomalies of the conducting system, or structural heart diseases, but also without evidence of a morphologic substrate. The curcial aspect in the evaluation of athletes with (possible) arrythmias is the presence of strucural heart disease. The evaluation of athletes with either documented or suspected arrhythmias includes a detailed personal history including substance abuse, previous cardiovascular diseases, cardiovascular symptoms, and, most importantly a detailed family history. Cardiovascular risk factors for coronary artery disease should be investigated particularly in athletes aged >35 years. Furthermore a physical examination and an ECG, exercise testing, laboratory workup, 24 h Holter monitoring, and echocardiography are warranted. Further workup with cardiac magnetic resonance imaging may be indicated. When initial testing fails to demonstrate the arrhythmia external event recorder or loop recorderss may be considered. Finally, an electrophysiologic study is indicated when the arrhythmia is paroxysmal and/or associated with haemodynamic impairment. After a detailed assessment and risk stratification, sports eligibility is then discussed based on the findings and the type of sports and level of sports of the athlete on an individual basis in shared desicion making with the athlete, his family, relevant sporting bodies, trainers and the sports cardiologist. Indications for pacemakers and ICDs do not differ

from non-athletes and the implantation of these devices should not be performed to allow for sports paricipation. However, if an indication for PM/ICD is present, even these athlets may be able to compete, however, within special programming, certain limitations and advices.

MANAGEMENT OF ATHLETES WITH CARDIOVASCULAR CONDITION

Milena Antić

Serbian Institute of Sport and Sports Medicine

Abstract

Physical activity has multiple health benefits, but paradoxically vigorous exercise elevates the risk of sudden cardiac death (SCD) especially in individuals with underlying cardiovascular condition. Athletes harboring cardiovascular disease have an increased risk of clinical deterioration and SCD in comparison to sedentary individuals with the same disease, though it is difficult to estimate the precise risk attributable to exercise. In athletes under the age of 30 years, the incidence of SCD is low and in most cases occurs in individuals with inherited heart disease. In the older athlete sudden death is more common and is generally due to arrhythmias in the context of coronary artery disease. Most victims lose several decades of life from cardiac diseases which are detectable during life and for which several lifestyle and therapeutic interventions can minimize the risk. It is on this premise that both the American Heart Association and European Society of Cardiology recommend screening athletes for disease.

Eligibility recommendations for competitive sports participation for athletes with cardiovascular abnormalities are conservative in nature, largely based on expert opinion and are designed to address all potentially avoidable deaths attributable to exercise. Competitive sports, however, is contraindicated in most forms of structurally heart diseases: hypertrophic cardiomyopathy, dilated cardiomyopathy, myocarditis, pericarditis, arrhythmogenic right ventricular cardiomyopathy / dysplasia and in some arrhythmogenic disorders without structurally heart disease such as long and short QTc syndromes, polymorphic ventricular tachycardia and Brugada syndrome. In most European countries, the recommendations of medical societies or public bodies state that these diseases have to be ruled out by prescreening before an individual can participate in competitive sports.

Until more evidence is available, physicians have a duty of shared decision-making with athletes when discussing the risks and uncertainties of intense exercise in those with underlying cardiovascular conditions. However, it is a commonly held misconception that these individuals are safer being sedentary. Moderate exercise confers numerous health benefits and individuals with cardiovascular conditions should receive tailored advice on how to continue regular physical activity safely.

EXERCISING RECOMMENDATIONS FOR PAROXYSMAL AF IN YOUNG AND MIDDLE-AGED ATHLETES - PAFIYAMA SYNDROME

Ivana Nedeljković[1] , Vojislav Giga V[1]., Nenad Dikić[1,2], I. Nikolic I[3], Tamara Antić[2,3], Marija Andjelković[1,4], Marija Zdravković[2,5]

Clinic of Cardiology, Clinical Center of Serbia, Medical Faculty, University of Belgrade[1]
Antidoping agency of Serbia[1], Faculty of Physical Education and Sports Management, Singidunum University[2], Outpatient Clinic for Sport Medicine 'Vita Maxima', Belgrade[3], College of Sports and Health, Belgrade[4], Hospital Center Bezanijska Kosa[5]

Abstract

An enhanced risk of atrial fibrillation (AF) has been confirmed in endurance athletes and was described as strenuous endurance exercise-related atrial fibrillation (AF) under the acronym of 'paroxysmal AF in young and middle-aged athletes' ('PAFIYAMA'). An enhanced risk of AF has been clearly documented in endurance athletes with increased risk between 1.2- to 15-fold compared to the general, sedentary population. However, incidence of PAFIYAMA syndrome may be underestimated as the large number of subjects regularly performing endurance exercise (i.e., medium-distance running, cycling, mountain walking, etc.).

Recommendations for these patients are not clearly defined. However, the safe continuation of regular exercise in patients with PAFIYAMA syndrome should be examined individually i.e., frequency, duration, precipitating factors, symptoms associated, modes of termination of AF. Thus, the training should be individually prescribed as the therapeutic measure simultaneously with medical and electrophysiological treatment. Light to moderate intensity endurance exercise has beneficial effect for chronic AF. Light to moderate-intensity aerobic exercise is beneficial. Aerobic exercise training program should be classified regarding intensity, time (duration) and frequency and should

be performed in well-defined sessions with hemodynamic monitoring of HR and BP. Exercise induced palpitations, chest pain, severe breathlessness or exhaustion are the reason for craniological re-evaluation and reduction of physical activity.

These recommendations should be respected by professional athletes with antiarrhythmic drug and/or ablation as the first line therapy.

SUDDEN CARDIAC DEATH IN YOUNG ATHLETES

Vojislav Parezanović

Professor at Faculty of Medicine, University of Belgrade, head of Cardiology Department, University Children's Hospital, Belgrade, Republic of Serbia

Abstract

Exercise is necessary for an optimal physical, emotional and psychosocial development for healthy children and adolescents. Even so, patients with cardiac conditions who engage in exercise and athletic competition may on rare occasion experience sudden cardiac death (SCD).

Sudden cardiac death (SCD) is the most frequent medical cause of sudden death in athletes, and estimates vary widely based on the population. Current rates of SCD appear to be at least 4 to 5 times higher than previously estimated, in the range of 1 in 50,000 athlete-years overall. Though SCD is rare, its occurrence in athletes who are often young and presumably healthy has a large emotional and social impact on their family, colleagues, trainers and whole community. Substantial effort has been made to better understand the causes of SCD in athletes and to discover optimal strategies for prevention.

Causes of CHD in young athletes can be congenital (inherited) or acquired heart diseases, due to structural heart abnormalities or some severe dysrhythmia on morphologically normal heart. The most common causes of SCD in younger athletes are inherited diseases like hypertrophic cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, congenital long QT syndrome or congenitally coronary artery anomalies. Unfortunately, many of these diseases may not be clinically apparent and may first be present with sudden death.

Preparticipation screening tests have a key role in detection of cardiac diseases which can cause SCD, especially in asymptomatic athletes. The European recommendations suggest a medical history taking, physical examination and 12-lead ECG as minimum diagnostic pan-

el for young athletes who participate in competitive sports. In some cases, echocardiography and exercise stress test are necessary.

Even with widely acceptable preparticipation screening programs, SCD can occur on the playfield during sports activities as the first sign of severe cardiac disease. So, training in cardiopulmonary resuscitation at a community level (especially for trainers and other sports workers), as well as adequate equipment around courts (like automated external defibrillators) are important tools for further reducing of SCD in athletes.

EXERCISE INDUCED ARRHYTHMIAS IN CHILDREN AND ADOLESCENTS

Vladislav Vukomanović, Jovan Košutić, Sergej Prijić, Saša Popović, Ivana Cerović, Sanja Ninić

Mother and Child Health Care Institute of Serbia "Dr Vukan Čupić", Belgrade, Republic of Serbia

Abstract

Besides the well-known long-term benefits of physical activity on cardiovascular system in all ages, exercise can induce life-threatening arrhythmias, being the leading cause of sudden cardiac arrest in children and adolescents. The arrhythmia can occur during or shortly after physical activity and the intensity of provoking exercise vary among the individuals. The concerning rhythm disorders involve atrial fibrillation and ventricular arrhythmias (premature ventricular beats, ventricular tachycardia, Torsades de pointes and ventricular fibrillation). Arrhythmia provoked by physical activity mainly develop in children with underlying cardiac condition, which could be classified into channelopathies, cardiomyopathies and congenital heart disease (mostly after surgical correction), but also occur in children without any recognised substrate. Of particular importance is the exercise induced arrhythmia as the first manifestation of the disease, since it requires prompt recognition and usually resuscitation. Recent studies provide evidence to support the premise that strenuous physical activity is not only able to trigger cardiac events, but can also promote the development of arrhythmia in individuals without previous potential for it or lead to progression of inherited or acquired cardiac conditions with arrhythmogenic potential, which are mainly focused on atrial fibrillation and right ventricular tachycardias in young adult athletes.

In order to improve diagnosing of these potentially lethal conditions, every child with altered state of consciousness during physical activity should be subjected to thorough examination, including exercise testing specific for paediatric patients. Modalities od treatment are

broad, considering emergency response measures, antiarrhythmic drugs, radiofrequency ablation, implantable cardioverter defibrillators, but beyond others, life style changes and acceptance of sport restrictions, which is still a great challenge both for the doctors and the patients. Among the leading aims remain the tendency to recognise the underlying conditions before the arrhythmia occurs, as well as further investigations of correlation between vigorous physical activity and the exaggerated risk of arrhythmia.

Key words: arrhythmia, exercise, children

Program

16.45 – 19.00	Session 5: Key notes lecturers

Chairs: Branislav Jevtić (Serbia) and Yannis Pitsiladis (UK)

Time	Topic	Lecturer
16.45 – 17.10	Direct to consumer genetic testing: helpful, harmful or pure fun	Yannis Pitsiladis (UK)
17.10 – 17.35	The current development of sports medicine	Fabio Pigozzi (Italy)
17.35 – 18.00	Improvement of competition results in elite and professional sports – challenges for sports medicine and sports sciences	Branislav Jevtić (Serbia)
18.00 – 18.25	Athlete Health Evaluation, Aspetar Model	Emin Ergen (Aspetar, Qatar)
18.25 – 18.50	Health exercise: the problem of dosing	Duško Spasovski (Serbia)
18.50 – 19.00	Panel discussion and questions	

THE CURRENT DEVELOPMENT OF SPORTS MEDICINE

Pigozzi Fabio[1,2]

Department of Movement, Human and Health Sciences, University of Rome Foro Italico, Rome, Italy, International Federation of Sports Medicine, Lausanne, Switzerland

Abstract

This presentation will focus on the current development of sports medicine by discussing the contribution made by FIMS to the definition of practices to protect the health of the athletes through education and prevention. According to its manifesto, FIMS is committed to promoting worldwide the image of sports physicians as both specialists of health care of the athletes and moral agents who act following specific ethical principles. This includes being responsible for the athlete, promoting, securing and maintaining his health both in the short and long term. FIMS also contributes to promoting ethical values in the context of contemporary sport, advancing a cultural agenda for spreading the principles that inspire sport as a social practice, developing a non-coercive, preventive role for medicine and for all the organizations which use the knowledge from this science to support sport activity and its practice. In the next years, another major challenge facing FIMS will be the promotion of sports medicine through education, research, conferences and workshops. FIMS is convinced that education and science must be the fundamental principles informing all its future actions and successful policies. The importance of cooperating with national and international bodies to implement effective political and educational strategies aimed at spreading a culture of holistic care and well-being through sport and physical activity should also be highlighted.

PROGRESS OF COMPETITION RESULTS IN TOP AND PROFESSIONAL SPORT - CHALLENGES FOR SPORTS MEDICINE AND SPORTS SCIENCES

Branislav Jevtić

Faculty of Sport and Physical Education, University of Belgrade, Serbia

Abstract

Progress of competition results on the level of top sport flows through the chain of change, from the level of athletes and training programme to the level of the sports organization and organization of the sport`s event. It`s come out from the training and competition praxis, as well as from the science and "sports industry", which means, the progress is a imposed by laws of science, sport events and sport market. From the striving for progress in results are not a resilient even the athletes on the level of child and the sport of the youth. Nevertheless, desire for progress and higher level of competition performances create the most serious problems among the athletes of all ages (male and female), specially among athletes witch are on threshold of the international sport career. Uncontrolled and unethical striving for progress in results is one of a reason for "drop out from the sports" conducted by a significant number of factors from endogenous and exogenous origin. The athletes adaptation by training toward the progress of sports results are based on the devotion and talent, innovative work of trainers, "informative explosion" in acquiring and disseminating scientific and applied knowledge, develop a specific training programmee, proficiency in coaching skills ... The progress is induce and by the ambition and market-oriented mission of the sports branch, media promotion of sports events and sporting heroes, leadership over sports and personal athletes by management structures. Not a small impact on the progress of the results has a race of states for the "Holy Grail" of national sport system witch lead to the international success. With that in mind, the conclusion on the theme of the progress of the competitive result as the challenges for sports

medicine and sports sciences, as subject of this paper, will be established on the analysis of professional and academic discourses as well as on the author reflection on the problems and their solutions during his duties at the position of sports director of the National Olympic Committee. Hence, analysis include: (1) formal and informal sources of knowledge about training technology, (2) doubt of praxis in relation to conclusion and recommendation of sports science, and (3) influence of training and competition technology on the health of athletes as well as on the philosophy of current and future sports science research and methods of sport-medical prophylaxis.

Keywords: competition results / top sport / sports sciences / sports medicine / training technology

ATHLETE HEALTH EVALUATION - ASPETAR MODEL

Emin Ergen

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Abstract

Periodic or pre-participation athlete health evaluation (PHE and PPHE) have always been a hot topic in sports medicine and several international bodies have produced consensus statements on the subject. In the meantime, national and international regulations also dictate the content of PHE and PPHE based on evidence based medicine and legislations. However, some aspects, like ethical and medico legal issues of PHE and PPHE, are neglected and need to be clarified. Aspetar Orthopedic and Sports Medicine Hospital is conducting PHE and PPHE on a regular bases for the registered (licensed) athletes under one roof and in one day. The experience gained from Aspetar PHE and PPHE model over the last 10 years shows that such an assessment should not only focus on preventing sudden cardiac death in sports but also provide health education to athlete's entourage. The aim of this presentation is to give a brief information about the content of Aspetar Model of PHE and PPHE and emphasize on the recent discussion on medico-legal and ethical aspects, in general.

HEALTH EXERCISE: THE PROBLEM OF DOSING

Duško Spasovski

Orthopedic surgeon at Pediatric Orthopedics Department Institute of Orthopedic Surgery Banjica, Belgrade, Republic of Serbia

Abstract

The effects of exercise on health and sports-specific parameters are well known and utilized. But indication and dosage of exercise in practice are mostly based on metabolic parameters and predefined workout routines. Exercise prescription and dosing is poorly related to athlete's musculoskeletal parameters such as anthropometric and motoric tests. This type of data must be used for indication, monitoring and evaluation of exericse-induced change in musculoskeletal posture and performance.

This problem is mostly due to neglection of thresholds in latent anthropomotoric space. If a threshold for muscle hiperthrophy, or for connective tissue stretch is not achieved, no change in those tissues are expected. Motor control, however, reponds to every input from neuromyofascial network that pervades our body, contributing to complexity of exercise dosage. In order for exercise prescription and dosage to be both precise and time-efficient, IT technologies could be used.

Software-assisted exercise prescription and dosing provides individualization of the exercise programs in coordance with athlete's motor parameters, sport-specific needs and personal affinity. CoreFitMax algorhitm is based on Human resting muscle tone (HRMT) and is aimed at improving active body mobility and balancing HRMT by dominantly proprioceptive stimulation. Digital data format also enables accurate progress monitoring.

Key words: health exercise, computer-assisted dosing, anthropometric tests, human resting muscle tone

Program

	Saturday May 25th 2019
8.30 – 18.00	Registration (Sava Center, Belgrade)
	Hall 1/0

9.00 – 10.30	Session 6: Sports performance & Nutrition

Chairs: Vladimir Jakovljević (Serbia) and Nenad Dikić (Serbia)

Time	Topic	Lecturer
9.00 – 9.20	Dietary supplementation practices in high-performance athletes	Marija Andjelković (Serbia)
9.20 – 9.40	Supplementation in team sports: antioxidative and other properties	Vladimir Jakovljević (Serbia)
9.40 – 10.00	n-3 PUFA and n-6 PUFA supplementation in young male soccer players	Vladimir Živković (Serbia)
10.00 – 10.20	Food intolerance and sport performance	Nenad Dikić (Serbia)
10.20 – 10.30	Panel discussion and questions	
10.30 – 11.00	Coffee / Exhibition	

DIETARY SUPPLEMENTATION PRACTICES IN HIGH-PERFORMANCE ATHLETES

Anđelković Marija, Dikić Nenad, Vukašinović Vesić Milica, Baralić Ivana, Đorđević Brižita, Blaženčić Mladenović Vera, Bekić Jelena, Popović Milka, Jovanović Zoran

Center for Sports Nutrition and Supplementation (CIS); Sport medicine association of Serbia, Belgrade, Republic of Serbia

Abstract

Background: Nutritional status help us to reveal athletes dietary habits, set dietary nomograms and supplementation practicies. The inadequate nutrition is caused by lack of education, skills, time and finance. As a result of monotonous food athletes have deficiency of microelements and unproper macroelements proportion. Supplementation practices must come from evidence based guidelines and athlete individual dietary analyses.

Methods: Our study includes 144 high performance athletes who came to the Center for Sports Nutrition and Supplementation in last 6 years. The individual program included physician's examination, body composition, eating and supplements habits, blood analysis, three-day diet diary, accelerometer use for physical activity and nutritional software for diet analyses.

Results: 60.4% were men and 39.6% were women from 29 different sports with age ranged from 12 years to 35 years. Basic nutritional habit values are presented in table.

	Unit (± SD)	Man athletes	Female athletes
Energy intake (EI)	kcal / day	2882.5±900	2076.2±545.2
Energy expenditure	kcal / day	3310.8.8±506.0	2488.3±417.2
Carbohydrates	% EI	45.5±6.9	46.4±7.2
Fat	% EI	35.3±5.1	34.7±6.3
Proteins	% EI	19.2±3.7	18.9±3.6
Water	(g/day)	2434.5±873.5	1862.9±940.2

Most of athlete wanted nutrition advice (29%), others wanted to reduce (24%) or increase body weight (11%). Athletes were dehydrated with energy deficit, insufficient carbohydrate and increased fat intake. Athletes showed a deficit in the intake of iron, iodine, potassium, magnesium, selenium, biotin, pantothenic acid and vitamins D, E, K. Calcium, copper, folate, sodium, phosphorus, niacin, riboflavin, thiamine, cobalamin and vitamin C were above recommended values.

Conclusion: Practical recommendations include increase in carbohydrate intake, proper hydration, reduced fat intake and balanced input of fruits and vegetables. Supplements should be taken with expert advice.

N-3 PUFA AND N-6 PUFA SUPPLEMENTATION IN YOUNG MALE SOCCER PLAYERS

Vladimir Živković[1], M. Nešić, D. Cubrilo[2], N. Jeremić[3], V. Vučić[4], V. Jakovljević[1,5]

[1]Department of Physiology, Faculty of Medical Sciences, University of Kragujevac, Serbia, [2]Faculty for Sport and Tourism, `Edukons` University, Novi Sad, Serbia, [3]Centre of Research Excellence in Nutrition and Metabolism, Institute for Medical Research, Belgrde, Serbia, [4]Department of Pharmacy, Faculty of Medical Sciences, University of Kragujevac, Serbia, [5]Department of Human Pathology, 1st Moscow State Medical University IM Sechenov, Moscow, Russian Federation

Abstract

The aim of this study was to assess the effect of different diets in terms of various proportions of polyunsaturated fatty acids (n-3 and n-6 PUFA), on the morphological and functional parameters, as well as pro-inflammatory and mediators of oxidative stress, at rest and after maximal exercise test before and after a two-month training program. The study included 75 young players of the youth soccer school `Kragujevac`, aged 18 - 19 years. All subjects had sports experience of minimum 5 years, with 12 hours of training per week. They were classified into three groups: 1. experimental group (received fish oil (n-3 PUFA), 2. experimental group (received sunflower oil (n-6 PUFA) and the control group. All subjects underwent a standard sport-medical examination and then determination of the level of proinflammatory mediators and the level of oxidative stress markers at rest and after a maximal exercise test before and after a two-month training program. Suplementation of fish and sunflower oil was associated with an increase in aerobic power of the tested players, and can be very useful in the reduction of oxidative stress, as well as raising in activity of antioxidant enzymatic system of our subjects. During exercise testing different types of PUFA supplementation had

no significant effect on oxidative stress markers. Also, the use of different types of PUFA did not significantly affect the production of cytokines immediately after acute exercise test. Diet supplement that includes fish and sunflower oil, combined with expert guided and carefully planned training process has a positive effect on increasing the functional characteristics and oxidative-inflammatory response of tested players, which is extremely important in raising the level of their physical fitness and achieving top sport performance. This findings may be useful in assessing the quality of training, which in adolescents is crucial for proper mental and physical development and further career.

Key words: n-3 PUFA, n-6 PUFA, supplementation, young male soccer players

FOOD INTOLERANCE AND SPORT PERFORMANCE

Nenad Dikić[1,3,4], Marija Anđelković M[2,3,4], Marija Vukašinović Vesić[3,4]

Faculty of Physical Education and Sports Management, Singidunum University[1],College of Sports and Health, Belgrade[2], Center for Sports Nutrition and Supplementation (CIS)[3], Sport medicine association of Serbia[4],

Abstract

Objective: Intensive and frequent physical activity can increase gastrointestinal barrier permeability leading to food intolerance. Athletes with self-diagnosed intolerance and self-prescribed gluten free diet becomes more frequent in last period. There is real need to investigate this belief and its impact on sport performance and general health. The aim of our study was to investigate the impact of food elimination diet on general health and sport performance.

Methods: In our longitudinal study 12 males and 10 female high level athletes participated (mean age 25 years). They respect 3-month elimination diet based on the results of specific IgG food intolerance blood test. The basic medical examination, cardiopulmonary testing, IgG food intolerance blood test, Allergy Questionnaire for Athletes (AQUA) and Gastrointestinal Symptom Rating Scale (GSRS) were assessed prior to and after the study.

Results: AQUA scores were significantly lowered with trend to a significant reduction in GSRS score. Specific IgG antibodies values were significantly decreased for all athletes and all foods they were intolerant to. Body fat percentage decreased significantly. Heart rate at the second and the third minute recovery phase was significantly lower. The flexibility of athletes significantly increased. Very important is a significant reduction of the self-assessed indigestion syndrome.

Conclusions: Food intolerance diet decreased chronic inflammation of gastro tract, influenced on athletes' body composition and had indirect improvement of their sports performance.

Program

Number	Time	Posters Presentations
P – 01	10.30 – 11.30	Ayurveda as sports injuries prevention program Aleksandra Sanader
P – 02	10.30 – 11.30	Gender differences in body composition of university students Ana Lilić
P – 03	10.30 – 11.30	Differences in Motor Skills Regarding to the Player Positions in the Team Badnjarević Nemanja
P – 04	10.30 – 11.30	Classification Serbian Road Cyclists by Specialty by Cardiovascular and Respiratory Variables Biljana Nikolić
P – 05	10.30 – 11.30	Does hypermobility impact on injury rate in artistic gymnastics: the descriptive observational study Bojan Bukva
P – 06	10.30 – 11.30	Body mass index and percentage of body fat among athletes Dušan Antić
P – 07	10.30 – 11.30	Sports Children Cardiological Problems Gordana Grujić Ilić
P – 08	10.30 – 11.30	Result Obtained by Screening of Posture of Schoolchildren in Belgrade Jadranka Plavšić
P – 09	10.30 – 11.30	Anthropometrical and physiological profile of elite female handball players from R. Macedonia J. Pluncevic Gligoroska
P – 10	10.30 – 11.30	Activities of children from rural and urban municipalities Jelena Stošić

Number	Time	Posters Presentations
P – 11	10.30 – 11.30	Differences In Postural Status Of The Spinal Column In Female Volleyball Players Of Different Age Categories Katarina Nejić
P – 12	10.30 – 11.30	Diet and nutrition knowledge in prevention of overreachingand overtraining syndrome among kayakers Ljiljana Bjelaković
P – 13	10.30 – 11.30	Effects of mesotherapy procedures in knee pain treatment – case report Marija Macura
P – 14	10.30 – 11.30	Risk Factors for the Occurrence of Hypertension in Athletes Milena Antić
P – 15	10.30 – 11.30	Influence of sodium citrate on endurance and organism of active athletes Nikola Prvulović
P – 16	10.30 – 11.30	Physiological characteristics of the ABA League players at the preparatory period Ratko Perić
P – 17	10.30 – 11.30	Contribution of Psychodiagnostics in Contemporary Sports - Practical Experience From Serbian Institute of Sport and Sports Medicine Tijana Ćirković Higl
P – 18	10.30 – 11.30	Differences of Q Angle in Male and Female Athletes Vasiljević Marko
P – 19	10.30 – 11.30	Sports medicine in health system in Serbia Zoran Šarčević

AYURVEDA AS SPORTS INJURIES PREVENTION PROGRAM

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Abstract

Sport is worldwide so prevention of negative phenomena and injuries in sports is important not only for athletes success but also as a moral issue. This is way holistic aisent knowledge, ayurveda, take a place in sport.

Ayurveda (sanskrit) means knowledge of life and longevity. Its main principle could be defined as mind-body synchronicity through compliance with three doshas (vata, pitta, kapha) in all dimensions of nature. Doshas disbalans increase body and mind stresses, ie. sports injuries risk. The bigining point is determination of athletaes constitution (doshas type) but his current state as well. In acoording to that it is advisable sport type, exercise volume, intensity and frequency, diet, etc. The harmony is achieved by the proper breathing exercises, that are specialy recomended to elite athletes, because of its benefits in precompetition state - both mind and body (Sanader, A., Stojilkovic, J. & Windenberger, S. 2015). Vegetarion is generally recommended but not necessarily. Ajurveda program includes high quality organic suplements, eg. Sports Rasayana (Rasayana for Strength), Ayur-Fit (Rasayana for Energy), and tretments as an effective means of immunity and recovering athletes, eg. Panchakarma. Meditation is involved as well. Transcedental meditation is an authentic, original form, a scientific improvement in the Maha-

rishi Ayurveda - MAV. It is a great benefit of integrating cutting-edge science with the ancient wisdom of the Vedas as Ramayan in Human physiology (Nader, 2011).

The sport is a source of physical, physiological, psychosocial, environmental stresses that increase sports inguries risk. Ayurveda in sport aims at promoting, preventing, curative, corrective as well as rehabilitative aspects of an atheltes.

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GENDER DIFFERENCES IN BODY COMPOSITION OF UNIVERSITY STUDENTS

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Abstract

Background: The aim of this research was to determine the difference in body composition between male and female active students, whose education program requires participation in one course of aesthetic coordination sports. Total body fat tissue in adults varies with age, gender, degree of adiposity, and race or ethnicity.

Materials and Methods: the sample of participants included 25 male (average age of 19± 0.91) and 31 female students (average age of 21± 1,03) from Faculty of Sport and Physical Education University in Niš. Body composition was evalueted usng InBody 770. The InBody 770 provides the most extensive analysis of the body and we determined parameters of: Body composition analysis, Muscle-Fat analysis and Obesity analysis. We used 10 parameters for research: intracellular (ICW) and extracellular (ECW) water, total body water (TBW), body fat mass (BFM), fat free mass (FFM), precent body fat (PBF), BMI, skeletal muscule mass (SMM), proteins (PRO) and minerals (MIN). T-test for small independent samples was used to determine the difference between the mean value of the students results. Statistical analyses were carried out using the statistical package SPSS (v. 19), at the level of significance of $p \leq 0.05$.

Results: The results have shawn that there were statistically significant differences in nine parameters (except BFM= .08) in body compositions, with level of significants between .00 - .03 (ICW, ECE, TBW, PRO, MIN, SMM, PBF FFM = .00; BMI= .03).

Conclusion: Such large differences in body composition need to be supplemented with information on the socio-economic status of students, physical activity outside of classes and specific eating hab-

its. The analysis of the differences in body composition can monitor trends and detect unusual distribution that can result from injury, aging, obesity, and other health factors.

Key words: students, composition, fat, skeletal muscle mass

DIFFERENCES IN MOTOR SKILLS REGARDING TO THE PLAYER POSITIONS IN THE TEAM

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Abstract

Introduction: Beside of proficient technique tactics skills, modern football game requires players with significant levels of motor abilities such as speed, agility and power. Levels of motor abilities also influence talent identification and development programs. Players with high-level of motor and functional abilities may perform technical and tactical skills at higher level during training and competitions.[1]

The aim of the present study was to explore differences of the motor abilities in the group of young and prospective Serbian football players with relation to the position in team.

Methods: We tested 157 prospective players in U14 selection. In relation to the position in team participants were divided into 4 groups: Goalkeepers: N=20, N=43 defenders, midfielders N=50 and N=44 attackers. Football players performed a standardized specific field tests in order to assess speed (sprint 10m, 20m and 30m sprint), agility (zig-zag without and with the ball ZZ and ZZB), and power (vertical jump). The results were analyzed by applying descriptive statistics and multivariate analysis.

Results: Statistically significant difference has been revealed between the groups of midfielders and attackers for the tests 20S $p = 0.011$; 30S $p = 0.016$; ZZB $p = 0.035$ and CMJZ $p = 0.011$.

In addition, attackers have been found to be more proficient in dribbling control compared to goalkeepers ($p = 0.041$).

Conclusion: According to obtained results, team position differences in motor abilities have been found in the group of young and prospective Serbian football players. Particularly, attackers have been characterized with higher speed, agility and power abilities compared to midfielder players. It is expected since modern football require attackers with high levels of mentioned abilities.2

In addition, attackers showed higher levels of zig zag ball control compared to goalkeepers that is expected considering that specific preparations of goalkeepers is not focused to development proficient dribbling control skills3.

Although more differences in motor abilities among specific team position could be expected in the senior age4, our study did not reveal other differences in the group of U14 players. This is also expected considering that the selection should not be dominant in the age of U14, long-term training programs follow psychophysical development and sensitive periods while high volume of the training is still focused of technical development. In addition, in the evaluated sample of players, the most of evaluated abilities are still trainable, their development is not finished and therefore coaches should use tests results before all for training process optimization.

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CLASSIFICATION SERBIAN ROAD CYCLISTS BY SPECIALTY BY CARDIOVASCULAR AND RESPIRATORY VARIABLES

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Abstract

The aim of study was to determine differences in cardio respiratory parameters of male cyclists according to their specialty (flat rider, hill rider and sprinter) and obtain a multivariate model for further cyclists' classification by specialties, based on selected variables. Different variables determine the performance of cyclists, which brings up the question how these parameters may help in their classification by specialty. Seventeen variables were measured at sub maximal and maximum load on the cycle ergometer Cosmed E 400HK (Cosmed, Rome, Italy) (initial 100W with 25W increase, 90-100 rpm). Multivariate discriminant analysis was used to determine which variables group cyclists within their specialty, and to predict which variables can direct cyclists to a particular specialty. Among nine variables that statistically contribute to the discriminant power of the model, achieved power on the anaerobic threshold and the produced CO2 have the biggest impact. The obtained discriminatory model correctly classified 91.4286% of flat riders, 85.7143% of hill riders, while sprinters were classified completely correct (100%), i.e. 92.1053% of examinees were correctly classified, which point out the strength of the discriminatory model. Respiratory indicators mostly contribute to the discriminant power of the model, which may significantly contribute to training practice and laboratory tests in future.

Keywords: cyclist, cardio respiratory variables, discriminate analysis, classification by specialty

DOES HYPERMOBILITY IMPACT ON INJURY RATE IN ARTISTIC GYMNASTICS: THE DESCRIPTIVE OBSERVATIONAL STUDY

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Abstract

Background: It is presumed that Generalized Joint Hypermobility (GJH) causes decreased joint stability, thereby increasing the risk of joint and soft tissue injuries during sports activities, especially in young athletes. The aim of this study was to determine the correlation between the hypermobility rate (using the Beighton`s modification of the Carter-Wilkinson criteria of hypermobility) in artistic gymnasts and injury rate, during the one competition period (one year).

Materials and Methods: This study observed 24 artistic gymnasts (11-26 years old), members of Qatar National Team in artistic gymnastics. The Beighton joint hypermobility screen and a seasonal injury survey were used to descript. We observed following parameters: the gymnasts characteristics (age, gender), the gymnastics characteristics (training per day and number of years in training artistic gymnastics) and it's relations to injury rate.

Results: The lower back pain injury was the mostly injured anatomic region, followed by knee, shoulder, hip and ankle injuries. The strong correlation of number of years gymnastics training and injury rate was found ($p<0.001$). We found no significant correlation in the numbers of hours training during one week and hypermobility score to numbers of injuries ($p>0.05$).

Conclusion: According to this study there is no correlation between GJH rate and injury rate in artistic gymnasts in Qatar. Total training period in gymnastics have greater contribution in injury rate.

Key words: hypermobility; injury rate; gymnastics; athletes

Authors: Bojan Bukva, Sinisa Ducic, Branislav Krivokapic

BODY MASS INDEX AND PERCENTAGE OF BODY FAT AMONG ATHLETES

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Abstract

Background: Bioelectric impedance analysis (BIA) is an electrical method of assesing human body composition that has the potential of quantifying total body water, fluid volumes, body cell mass, fat-free body mass, and few other components. It is fast, non-invasive and scientifically proven method, which could be very useful in everyday work.

Materials and methods: The study included 61 participants (40 men and 22 women; mean age was 23,6 ± 6,46). All participants were athletes, members of Athletic Club „Vojvodina“ Novi Sad, with minimum 3 trainings per week (different levels of competition, from local to international).

With the purpose of collecting data, it is used the electronic scale made by Tanita, currently considered as a gold standard of bioelectric impedance analysis scales and monitor.

Results: Body mass index (BMI) was 23,34 ± 2,21 for men and 20,71 ± 1,80 for women. Percentage of body fat (% F) was 15,6 ± 6,1 for men and 22,3 ± 5,4 for women. When it comes to difference between BMI and % F, 3 out of 44 (7,5%) of men and 4 out of 22 (18,2%) of women had BMI within the normal range but elevated % F.

Conclusion: In modern sports it is very important to analyze body compositions, such as percentage of body fat, but also other parameters. Weight (or BMI) alone is not a clear indicator of good health because it does not distinguish between pounds that come from body fat and those that come from lean body mass or muscle (for example, 2 athletes could be the same height and weight, same BMI, and after analyzing body fat levels one of them could have accetable percentages while the other one could have above the recommended range and would be at a higher health risk).

Key words: bioelectric impedance analysis, body mass index, percentage of body fat

SPORTS CHILDREN CARDIOLOGICAL PROBLEMS

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Abstract

Background: Pediatrician task in sport active children is to discover diseases that can endanger athlets.

Aim: To indicate the frequency of cardiovascular system symptoms in sport active children.

Materials and Methods: Children were examined in the period January 2016 – April 2019. Everyone was taken anamnesis (personal and family) from the person who brought the child or from the child himself. Heart auscultation was performed, blood pressure was measured, sistolic (SBP) and diastolic (DMP) and ECG was done. Laboratory analysis and echocardiography examination were done if needed.

Results: 1924 children aged 5-18 were examined. 677 (35.19% sporty active (476 boys and 201 girl). Heart murmurs were the most common reason for examination, 39.44% (40.13% boys, 37.81% girls), chest pain 18.61% of children (16.81boys%: 22.88 girls %), sport active 13.15%, increased blood pressure 8.27%.

Blood pressure values were normal in 94.24% of children. 4.87% of children had increased values of SBP , a higher percentage in the boys 6.37% (girl 1.49%). Increased DBP values were in 2.66% of children (2.97%: 1.99%), increased values of systolic and diostolic blood presure were 1.62% (1.91% boys ; 1% girls).

ECG findings were correct in 90.84% of children. 3.69%, had incomplete right bundle branch block (IRBBB), 2.21% nodal rhythm, 0.3% negative T wave in V4-V6, 0.74% WPW syndrome. 1.92% of children were with extrasystoles, atrial or ventricular.

Echocardiography solved dilemmas of murmurs, innocent or pathologic. It was corect in 92.07% of children. In 7.93% of children changes were found that required further appreciation and examination. Two boys stopped practicing, because of discovered cardiomyopathy.

Conclusion: It is necessary to examine carefully each child, take anamnesis, auscultation, measure blood pressure and do ECG. Then the pediatrician decides whether to perform an echocardiography, laboratory or to send a child to the Clinic for further examination.

RESULTS OBTAINED POSTURE SCREENING OF SCHOOLCHILDREN IN BELGRADE

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Abstract

Background: Nowadays, most children spend their free time with computers, tablets, mobile phones and other technical products. All children are less likely to be seen in the park, school yard or a big field to run, jump, play some of the group games. The consequences of sitting and physical inactivity are numerous (obesity and everything that accompanies obesity, poor posture, feet and vertebralcolumn deformities ....). Monitoring of posture and feet of children during periodic health examinations shows a sharp rise in the presence of deformities.

Aim: The aim of this study was to show the representation of spine and foot deformities in children of school age.

Materials and Method: This research included 1210 scholarship aged 7 to14 years old. The research was done within the project of the Serbian Institute of sport and Sports Medicine and City of Belgrade called "Healthy children, healthy city." In the context of screening for all children measurements were done of body weight, body height, ECG record in peace and classic review by systems. For the processing of data descriptive methods were used. The analysis of results obtained by measurements and examinations of schoolchildren established that being overweight were 234 children (19,34%), deformed back and chest had 571 children (47.19%), deformed feet 298 children (24,63%). These figures show an increase compared to previous research that were conducted by the Institute as well as ones that were conducted by the Institute for Public Health.

Conclusion: From the results we can conclude that the lack of physical activity, time spent on the computer and other modern means of communication lead to an increase in the number of deformities in children of primary school age.

ANTHROPOMETRICAL AND PHYSIOLOGICAL PROFILE OF ELITE FEMALE HANDBALL PLAYERS FROM R. MACEDONIA

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Abstract

Introduction: Apart from technical and tactical skills, physical fitness is very important for handball players. The optimal ratio of body mass components is correlated with sport performance. The purpose of this study was to determine anthropometrical profile of elite female handball players from Republic of Macedonia.

Material and methods: Twenty four (22) female handball players aged between 18 and 31 years took part in this study. Body composition was analyzed with anthropometric protocol by Matiegka, according which body weight is divided in three body components presented as relative (%) and absolute (kilograms) values: the muscular mass (MM), the bone mass (BM) and the body fat (BF). The results of Bruce ergometrical test were analyzed: exercise time (ET), heart rate at rest (HRR) and maximal oxygen consumption (VO_2max).

Results: The anthropometric parameters are expressed as mean (SD): body height = 175.33 ± 5.92 cm); body weight = 72.05 ± 10.67 kg. Body components: MM% = 51.75 ± 1.6%; BM% = 15.22 ± 2.37%; BF% = 17.51 ± 5.07. The thickest skinfold was measured at thigh (22.36 ± 3.94 mm). Regarding the ergometrical testing, average exercise time was 13.24 minutes which determined mean VO_2 max = 44.14 ±3.41 ml/kg/min.

Conclusion: The elite female players from the best handball team ever from R. Macedonia showed optimal body components and excellent ergometrical results which correspond with their sport's results. The obtained results could be part for the database values of body components in female handball players in our country that may be beneficial for the sports and health professionals to compare and evaluate the physical body status.

ACTIVITIES OF CHILDREN FROM RURAL AND URBAN MUNICIPALITIES

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Abstract

Background. Healthy upbringing of children implies a certain amount of physical activity that will ensure their proper growth and development regardless of the economic and regional status. The aim of this study was to determine the difference between the physical and accompanying activities of children from the urban and rural areas.

Methods. 798 children (374 boys and 424 girls) involved in the project "Sport in schools - healthy growth" aged from 6 to 10 years participated in a study in which their parents answered questionnaire.

Results. Children from rural municipalities are less engaged in organized sports than children from urban ($\chi\tilde{i}2 = 13.25$, $p < 0.001$), but the time spent playing outside does not differ between groups. Also, children from the city rather go to school by foot than children from the countryside ($\chi\tilde{i}2 = 82.33$, $p < 0.001$), but parents of the urban areas children more often carry their bags ($\chi\tilde{i}2 = 14.89$, $p < 0.001$). Rural children go to bed earlier ($\chi\tilde{i}2 = 16.01$, $p < 0.001$), but the night sleep and day sleep time does not differ. Majority of children, both urban and rural, use TV and social networks, with no differences among them.

Conclusion. According to the results of the study, children from rural areas are less physically active. The next study should determine 1) the reasons for the less physically active rural children, 2) quantify the total amount of physical activity of children from both environments, in order to improve the quantity of physical activities of childrens' both groups, since children have rights to be equally physical activity, regardless of geo-socio-economic status.

Key words: children, health, habits

DIFFERENCES IN POSTURAL STATUS OF THE SPINAL COLUMN IN FEMALE VOLLEYBALL PLAYERS OF DIFFERENT AGE CATEGORIES

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Abstract

Background: The postural status of the body, or the proper keeping of the body, is the precise positioning of the body segments in which the body has the lowest energy consumption. Asymmetric sports can contribute to the development of an asymmetric pose or the appearance of functional deformities on the spinal column.

Materials: The aim of this research is to determine the difference in the postural status of the spinal column of female volleyball players of different age categories.

Methods: The research included a sample of 30 female volleyball players of the First League of Serbia. Out of the total sample, 15 female volleyball players were junior, while the other 15 were senior. To determine the postural status of the spinal column, a measuring instrument "Spinal Mouse" was used. The obtained results were presented through descriptive statistics and frequency and percentage, while the Hi square test was used to determine the differences in the representation of postural deformities of the spinal column at the frontal and sagittal levels.

Results: The results obtained in this research study indicate presence of a very high percentage of postural deformities of the spinal column. In junior female volleyball players, deformities are present in thoracic part 60%, while in the lumbar 73.3%, and frontal 100%, in the senior sample deformity is present in the thoracic part 46.7%, in the lumbar 76.1% and in the frontal 73.3%.

Conclusion: A detailed analysis shows that all postural deviations, of

a functional type, are present in a large percentage, only of the first degree. This suggests that the cause of postural disorders in the spinal column is exclusively the result of muscle imbalance. Based on this, we can conclude that in addition to the regular part of the plan and program, training should include compensatory exercises aimed at stretching the muscles that had a more dominant activation in order to reduce the occurrence of postural deformities and preserve the postural status of the spinal column even after the end of the sports career.

Key words: junior age female volleyball players, senior age female volleyball players, kyphosis, lordosis, scoliosis

DIET AND NUTRITION KNOWLEDGE IN PREVENTION OF OVERREACHING AND OVERTRAINING SYNDROME AMONG KAYAKERS

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Abstract

Background: Kayaking is a sports and recreational discipline. The discipline of white-water kayaking is a dynamic and complex sport that requires the athlete to have specific motor skills and endurance. The data in literature indicate the positive effect of diet on physical fitness. The results of the research conducted by referral sports medical institutions specify that sports performance and the recovery of athletes can be influenced by optimal nutrition. The aim of this study was to examine the correlation between the knowledge of the basic principles of healthy nutrition, eating habits and the existence of symptoms of overreaching and overtraining.

Materials and Methods: The study was conducted in June 2018 on a sample of 29 young athletes aged 16 to 18 years old. Respondents completed a questionnaire containing questions related to dietary habits, nutrition knowledge and the existence of symptoms of overreaching and overtraining.

Results: The results of the study indicate that the respondents achieved a total score of 43.99% of the correct responses. Athletes (n=5) who have nutrition control at their clubs show better nutrition test results and they have an average of 74% of correct answers have healthier eating habits (occasional transition to semi-vegetarian or lacto-ovo-vegeterian diet) and generally report fewer overreaching symptoms.

Conclusion: Our results point to the positive effect of contin-

uous monitoring and nutrition planning by an expert as an important segment of athletes' recovery and an indispensable component of overreaching and overtraining syndrome prevention.

Key words: sports nutrition, overreaching, overtraining, kayaking

EFFECTS OF MESOTHERAPY PROCEDURES IN KNEE PAIN TREATMENT – CASE REPORT

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Abstract

Background: Knee pain symptoms are common occurrence that can influence movement function during walking and different types of everyday physical activities. Because of that, various treatment and rehabilitative procedures are used, with goal of improving current condition and reducing pain. Mesotherapy procedures are one way to address the issue. Aim of the study was to describe effects of homeopathic collagen application via mesotherapy procedure into the painful area of the knee.

Materials and Methods: Subject is a female patient and student of Faculty of sports and physical education, physically active, with jumper's knee diagnosis. Treatment was done in 10 sessions, once a week by application of homeopathic collagen into 10 points. Pain was measured by painDETECT questionnaire and 36-item short-form health survey (SF-36).

Results: After 5 sessions subjective pain was reduced on 0-10 scale from 7-10 to 3-4, and after 10 sessions the reported feeling dropped to 0-1. Nine months after treatment the average self-reported assessment was unchanged. On cumulative pain assessment scale, results showed decline in reported value from 15/38 points (39.5%) to 2/38 (5.3%), and nine months later it was 1/38 (2.6%). Self-assessed feeling of current health status was improved from 3/5 to maximum 5/5 at the end of treatment. Degree of disturbance in everyday activities was reduced after 5 sessions from 11/20 (55%) indicators to 2/20 (10%), and dropped after treatment to 1/20 (5%) indicator. Disturbance feeling 9/12 (75%) changed to value 3/12 (25%), with influence of pain towards quality of life reduction result showed drop from 32/50 (64%)

to 16/50 (32%) and after treatment was 6/50 (12%). After 9 months it reached 18/50 (36%).

Conclusion: Application of homeopathic collagen once a week, for 10 sessions showed improvement of life quality and decrease in knee pain, with unchanged results 9 months after last session.

Key words: Mesotherapy, knee pain, rehabilitation

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RISK FACTORS FOR THE OCCURRENCE OF HYPERTENSION IN ATHLETES

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Background: Considerable interest has been raised regarding the role of pre-participation screening for early identification of cardiovascular diseases which are responsible for sudden cardiac death and for disqualification of athletes at risk.

Aim: The aim of this study was to present the results of general health and cardiovascular screening that was done on Serbian elite athletes.

Materials and Methods: Research included 143 elite Serbian athletes in 15 different sports (98 men (aged 26 ± 5 yrs) and 45 women (aged 25 ± 5 yrs)). They were screened for the hypertension risk factors as a part of national sports-medical pre-participation screening. All athletes completed the health questionnaire, underwent physical examination with 12-lead ECG, anthropometric and blood pressure (BP) measurement, laboratory analysis and transthoracic echocardiography (TTE).

We used descriptive method and test of correlation (SPSS)

Results: Family history of cardiovascular disease and hypertension was found in 38.46% of screened athletes, sudden cardiac death (SCD) in 2.8% and diabetes mellitus (DM) in 17.5%. In 9% athletes arterial BP was above the normal range. Pre-hypertension was registered in 7%, while stage I hypertension diagnosed in 2.1 %. Training-related ECG was identified in 87.41% of athletes and training unrelated ECG changes occurred in 5.59%. Elevated total cholesterol (Hol) level has been found in 19.58% of athletes and triglyceride (TAG) levels in 2.1%. Serum glucose (Glu) level was elevated in 2.1%. In male athletes 6% had left ventricle end diastolic diameter (LVEDd) > 60 mm, left venticle wall thickness (LVWT) > 11 mm were present in 37 % and left ventricle mass index (LVMI) > 115 g/m2 was registered in

35.71%. In female athletes 4.44% had LVEDd > 55 mm, LVWT > 10 mm were present in 15 %, LVMI > 95 g/m2 was registered in 18.6%.

Conclusion: Athletes with higher systolic BP had statistically significant correlation with positive family history of DM (r=0.258; p=0.002) and with family history of SCD (r=0.206; p=0.014). BMI correlated with Glu level (r=0.17; p=0.049) and with TAG levels (r=0.19; p=0.028). Significant positive relationship was found between systolic BP and LVMI (r=0.45; p<0.001) and diastolic BP and LVMI (r=0.298, p=0.001).

Association between hypertension and left ventricular hypertrophy should be considered in elite athletes, although the increase left ventricular mass in athletes primarily related to adaptation to sport and to regime of training. Assessment and identification of CV risk factors provides the basis for the best prevention of SCD and other cardiovascular disorders in athletes population.

Key words: risk factors, hypertension, athletes

INFLUENCE OF SODIUM CITRATE ON ENDURANCE AND ORGANISM OF ACTIVE ATHLETES

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Niš, Republic of Serbia

Abstract

Background: Research for improvement of endurance in active athletes are scientific area with many branches. This review paper covers research branch of influence supplementation and nutrition that have positive effect on athletes' organism. Influence of sodium citrate was analyzed through past years and it's known for increase blood pH, HCO3 concentration, etc. While in recent researches results show new findings of his influence on endurance and organism.

Materials and Methods: Dosage of sodium citrate (0.5 g/kg body mass) and placebo are used in many studies for respondents. This review paper have findings from two groups of scientific papers older than 2010 and newer (double blind studies) with analyzed variables: BMI, maximum heart rate, hemoglobin, plasma volume (lactate and glucose in %), packed cell volume and result of endurance exercise before and after consuming sodium citrate.

Results: Results can be categorized in findings before 2010 and after. In new researches results show data for: p=0.01 difference before and after consuming dosage of sodium citrate for BMI and results of endurance physical exercise (exercise performed at 80% VO2MAX), p=0.05 for packed cell volume, hemoglobin and plasma volume (lactate). No significance for maximum heart rate and plasma volume (glucose). Sodium citrate improves endurance of athletes. Side effect of sodium citrate is gastrointestinal distress.

Conclusion: Older findings don't match conclusions of recent results. In new, sodium citrate is increasing extracellular pH and creates a favorable pH gradient for efflux of intracellular lactate

and H+. For working skeletal muscle, this means a delay in the fall in intramuscular pH to the critical level at which glycolysis is inhibited. Influence of sodium citrate has better perfusion of the exercising skeletal muscle.

Key words: sodium citrate, influence minerals on organism, endurance.

PHYSIOLOGICAL CHARACTERISTICS OF THE ABA LEAGUE PLAYERS AT THE PREPARATORY PERIOD

Ratko Perić[1]*, Aleksandar Jakovljević[1], Milica Jakovljević[1]

[1]Association for Contemporary Education in Sports "Sport Studio BL", Banja Luka, Bosnia

Abstract

Background: The basketball requires specific skills that ought to be maintained during high dynamic needs of the sport. As a result, athletes tend to possess higher endurance capacities and maximal strength while maintaining a lean body composition, making usage of both the aerobic (AeT) and anaerobic (AnT) metabolic systems compulsory. Therefore, the purpose of this study was to evaluate physiological characteristics of ABA League basketball players at the begging of the preparatory period and to evaluate if their AeT and AnT capacities correspond to the sport specific needs even after a prolonged competition pause.

Materials and Methods: Fifteen male basketball players participated in the study. Physiological measurements were taken during the initial week of their preparatory period for competition. Maximal oxygen uptake, metabolic thresholds and heart rate (HR) were assessed during graded exercise treadmill test till exhaustion using breath-by-breath gas analysis and monitored via HR integrated system. According to positional roles, players were categorized as guards, forwards, and centres.

Results: In the present group of subjects, VO2max was 54.95 ± 7.07 $ml \cdot kg^{-1} \cdot min^{-1}$ (range 48.10 to 71.30; 95% CI 51.03 to 58.86). Maximal HR was 183.80 ± 7.08 beats per minute (range 170 to 195; 95% CI 179.88 to 187.72). AeT and AnT occurred at 62.29 ± 7.10 % and 86.34 ±4.23 % of VO2max, respectively. Centres had higher body fat and body mass ($p < 0.05$) when compared to forwards and guards but lover VO_{2max} ($p < 0.05$). All subjects demonstrated modest correlation between VO_{2max} and AnT ($r = .60$, $p < 0.05$).

Conclusion: The results of the present study demonstrate a relationship between body composition dependent from the playing position, anaerobic capacities and VO_{2max}. Furthermore, even at the begging of the preparatory period, elite basketball players sustain superior AeT and AnT capacities compared to non-elite players.

Key words: endurance, basketball, training

CONTRIBUTION OF PSYCHODIAGNOSTICS IN CONTEMPORARY SPORTS - PRACTICAL EXPERIENCE FROM SERBIAN INSTITUTE OF SPORTS AND SPORTS MEDICINE

Tijana Ćirković Higl, Vladimir Kitanović

Serbian Institute of Sports and Sports Medicine, Belgrade, Republic of Serbia

Abstract

Psychodiagnostics in sports represents one of the fundamental areas in the field of sport psychology. It represents complex and always developing area that takes into account theoretical basis, methodological demands regarding development of metric instruments and technological progress. Considering the importance of mental preparation of athletes in order to achieve top results, one of the most important subject of sport psychology, from its very beginning, is understanding athlete's personality and the possibility to accurately determine the psychological characteristics that describe and predict future competitive success. Psychodiagnostics in sports started from the use of instruments created for the general population, or those made for clinical population, to development of sport specific instruments. Contemporary interactional approach in assessment of athletes' psychological status is based on measuring not only general personality traits, but also level of developed psychological features and skills that are sport specific, since they take into account personality characteristics on one hand and specific demands of competition situations on the other. Psychodiagnostics in sports is used in order to provide enough valid information about the athletes. Based on this information it is possible to plan and implement professional activities with the purpose of helping athletes to realize their full potential. In order to obtain reliable test results, it is necessary to esteem the psychometric demands of the test development, properly administer tests and follow the ethical principles of psychological practice. Modern psychodynamics is directed to developing reliable,

valid and discriminatory tests, creating software for monitoring simple and complex cognitive processes, using neuropsychological and psychophysiological data on athletes. The aim of this presentation is to summarize the goals of contemporary psychodiagnostics in sports, its limitations, ethical problems, and provide guidelines for the further development of this field of psychology, based on the experience of testing more than 20000 athletes from Serbia.

DIFFERENCES OF Q ANGLE IN MALE AND FEMALE ATHLETES

Vasiljević Marko, Božić Predrag, Badnjarević Nemanja, Janjić Dragoljub, Pujić Nenad, Mandarić Milan, Berjan Bačvarević Bobana

Serbian Institute of sport and sport medicine, Belgrade, Serbia

Abstract

Introduction: Quadriceps angle (Q angle) represents a significant concept in the functioning of the knee joint. Female and male have certain anatomical differences and therefore it could be expected that Q angle is different between female and male. The aim of this paper is to investigate differences in the Q angle between male and female professional athletes.

Methods: For the purpose of this research, 550 professional athletes (n=150 female, n=370 male) were tested. 7 Mocap 3D cameras (Qualisys system) were used to calculate Q angle. The Q-angle difference between male and female was tested using the T test.

Results: Results of the study revealed higher values in Q angle in female compared to male in both extremities (right leg $p = 0.02$, left leg $p = 0.01$).

Conclusion: Based on the results of this study, we can conclude that Q angle is a sufficiently sensitive measure in assesing anatomical difference between male and female. We can recommend using of the Q angle in assessing of the knee joint function as well as for the purposes of injury prevention and rehabilitation.

Keywords: Q angle, posture, injury prevention

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SPORTS MEDICINE IN HEALTH SYSTEM IN SERBIA

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Abstract

Background: Number of children engaged in organized sports activities in Serbia is rapidly increasing in the last decades. Nowadays 75-80% of all school children in big towns as Novi Sad or Belgrade participate in some sports activities. As it is well known, this is connected to many health benefits. However, intensive sports activities are also related to risks of injuries of the locomotor apparatus (the most common one being the ankle distortion, which in 60-65% causes degenerative changes of the ankle joint). Besides, it is demonstrated in the literature that engaging in sport activities does not diminish postural deformities in children. Some studies indicated that postural deformities are more common among young athletes than in children who do not practice sports. Sports medicine is the medical specialization of first choice for non-operative treatments and preventions of sports injuries.

Material and methods: Participants: A sample is taken from the population of young athletes in Serbia and sports medicine specialists in Serbia. Methods: Interviews with young athletes, their parents and sports medicine physicians. Analysis of the Law of Healthcare in Republic of Serbia.

Results: Sports medicine specialists are employed in health care centers in almost all municipalities in Serbia. By the Law of Healthcare in Republic of Serbia, only preparticipation screening of children younger than 15 years is covered by the budget of state. Sport medicine specialists cannot treat sports injuries in young athletes neither they can do preventive program within a healthcare system. Such treatments should be paid by the parents. Often parents could not afford to pay the treatments and advises of sports medicine spe-

cialists and sometimes children attend the trainings with injuries that can lead to degenerative processes. Only a tiny fraction of children athletes continue to be professionally engaged in sports and a big fraction of them become adults with some degenerative process in locomotor apparatus. They become frequent users of health services in adulthood.

Conclusion: Omitting the treatment of athletes from the Serbian public health system has a negative impact on the complete health of the population and also implicitly generates serious material costs. Hence, it would be of the utmost importance to return sports medicine into the Serbian health system.

Keywords: Sports medicine, Health system, Sports injuries in young athletes

Program

11:00 – 12:30	Session 7: Health Promotion and Healthy Lifestyle Programs for All

Chairs: Nebojša Tasić (Serbia) and James Bilzon (UK)

Time	Topic	Lecturer
11.00 – 11.20	HISPA – program and results	Nebojša Tasić (Serbia)
11.20 – 11.40	How can we provide and contribute a quality of life	Saša Plećević (Serbia)
11.40 – 12.00	The role of water in improving nutrition and healthy lifestyles	Mašenjka Katić (Croatia)
12.00 – 12.20	Exercise Guidelines for the Maintenance of Health and Wellbeing in People with Physical Disabilities	James Bilzon (UK)
12.20 – 12.30	Panel discussion and questions	
12.30 – 13.15	Lunch / Exhibition	

HISPA – PROGRAM AND RESULTS

Nebojša Tasić[1], Danijela Tasić[1], Marko Filipović[1], Milan Arsić[1], Zorana Kovačević[1], Dalibor Dragišić[2]

[1] Cardiovascular Institute Dedinje, Belgrade, Republic of Serbia
[2] Clinical Center "Dr Dragiša Mišović", Belgrade, Republic of Serbia

Abstract

HISPA Association was founded in order to identify, diagnose, treat and follow patients with elevated cardiovascular risks through a well coordinated and integrated network of hypertension, infarction and stroke prevention centers. HISPA represents a network of highly specialized and modernly equipped centers for diagnosing and treating serious cardiovascular patients. HISPA regards active cooperation between physicians of different specialties as the best way to treat a patient in his/her domicile health institution. Primary and secondary prevention of cardiovascular disease requires an integrated approach to health staff (doctors and nurses) in the direction of education, diagnosis and treatment of risk factors as well as a large number of diseases (hypertension, diabetes, renal failure, obesity, etc.). Two main directions of HISPA program are personalized approach which means that each patient with an increased cardiovascular risk receives, in addition of adequate diagnosis and monitoring personal program of nonpharmacological and pharmacological therapy, and multidisciplinary approach with participation of doctors with different profiles in the prevention of cardiovascular disease - cardiologist endocrinologist, nephrologists, neurologist physician general practitioners, physiatrists, nutritionists, clinical pharmacologists and others. In the last five years more than 10.000 patients went through HISPA program with significant decrease of cardiovascular risk in more than 80% of patients.

THE ROLE OF WATER IN IMPROVING NUTRITION AND HEALTHY LIFESTYLES

Mašenjka Katić

NutriProject Consultancy, Zagreb, Croatia

Abstract

Quantitatively speaking, water is the major nutrient in our diet - adequate total water intake proposed by the European Food Safety Authority for healthy sedentary adults living in temperate climate is 2.5 l/day for adult males and 2.0 l/day for adult females. Hot weather, humidity or clothing increase the need for water, besides physical activity being a major factor impacting water needs depending on length and intensity. Our overall diet is characterized by all of the foods and beverages that we consume daily and total water intake is obtained from all those sources. Nevertheless, in order to achieve a balanced diet within the active and healthy lifestyle, the importance of selecting drinking water as a dominant daily beverage should not be underestimated.

Water contributes to the maintenance of normal physical and cognitive functions as well as maintenance of normal thermoregulation. Moreover, water intake is being identified as one of the key elements for chronic disease prevention like chronic kidney disease, cardiovascular disease and obesity. Depending on the mineral composition, certain natural mineral waters have additional properties that can provide specific health benefits. This presentation will give insights to the importance of adequate hydration and specific use of mineral water as a functional beverage in improving overall nutrition and health.

EXERCISE GUIDELINES FOR THE MAINTENANCE OF HEALTH AND WELLBEING IN PEOPLE WITH PHYSICAL DISABILITIES

James L. J. Bilzon[1]

Department for Health, University of Bath, Bath, United Kingdom

Abstract

Following spinal cord injury (SCI) and Lower Limb Amputation (LLA) individuals experience a rapid decline physical function, health and wellbeing. This is characterised by a ~3-fold increase in morbidity and mortality associated with cardiovascular and metabolic diseases. These clinical outcomes are preceded by a higher prevalence of risk factors including central adiposity, hyperlipidemia and impaired glucose tolerance. The physiological basis for these metabolic dysfunctions are described in the Disability-Associated Low Energy Expenditure Deconditioning Syndrome (DALEEDS) model. The model highlights the impact of losses in skeletal muscle mass and function on function, health and wellbeing, across a range of physical disabilities. Therapeutic interventions should therefore include attempts to maintain resting and exercise energy expenditure through a combination of upper-body exercise and/or electrical stimulation, to maintain muscle mass and metabolic function. Current exercise guidelines for people with such physical disabilities recommend minimal amounts of moderate intensity cardiorespiratory exercise and resistance training for the maintenance of cardiorespiratory fitness and cardiometabolic health. However, the available evidence suggests that following these guidelines for 16-weeks has no impact on individual risk factors for metabolic or vascular function. Emerging exercise guidelines, underpinned by contemporary evidence, recommend higher intensities and volumes of individual and combined exercise modalities to maintain cardiometabolic health and wellbeing in individuals with physical disabilities. Both acute responses and chronic adaptations to higher intensity exercise suggest improved metabolic regulation, cardiorespiratory fitness and health-related quality of life. The contemporary evidence underpinning current and emerging exercise guidelines for individuals with physical disabilities will be systematically reviewed and practical objective recommendations presented.

Program

13.30 – 15.00	Session 8: Doping in Sport, Supplements / TUE

Chairs: Milica Vukašinović Vesić (Serbia) and Yannis Pitsiladis (UK)

Time	Topic	Lecturer
13.30 – 13.50	A Holistic Antidoping Approach for a Fairer Future for Sport	Yannis Pitsiladis (UK)
13.50 – 14.10	Innovations in sport science. Peak performance without doping	Irina Zelenkova (Russia)
14.10 – 14.30	New frontiers in Anti-Doping – from biomarkers to deterrence	Nenad Dikić (Serbia)
14.30 – 14.50	Current issues of Therapeutic Use Exemption (TUE): Practice, Problems and Perspectives	Viktoriya Badtieva (Russia)
14.50 – 15.00	Panel discussion and questions	
15.00 – 15.15	Coffee / Exhibition	

INNOVATIONS IN SPORT SCIENCE PEAK PERFORMANCE WITHOUT DOPING

Irina Zelenkova

Russian Olympic Committee Innovation Center

Abstract

Modern day sport is big business and no longer an amateur pastime for the privileged few but a vocation for thousands of athletes and their extensive entourage of physiologists, nutritionists, biomechanics, psychologists, and the like. This and the often enormous financial gains can motivate cheating and a philosophy of win at all cost. Doping is a problem well beyond the realms of Russia; a truly global problem affecting all sports. Given this reality, it is important that alternatives to drugs and prohibited methods are developed that can convince, especially the young athletes, that peak performance without doping is not a utopian myth but an achievable fact; a new paradigm in Olympic Sport. This paradigm shift will require the development and application of more effective sport science and sport medicine approaches that enables peak performance development without violating antidoping rules and/or the rules of the sport. These developments could include impactful predictive/diagnostic performance metrics involving innovative wearable devices together with the capacity for real-time analysis of data. The integration of these novel technological approaches will represent a paradigm shift in performance enhancement that is potentially far superior to the "traditional" prohibited substances and methods. Such a technological approach that is reasonably available to all in the spirit of the universality of sport, can also be used to help the athlete, coach, sports physician and sport scientist make better informed decisions in terms of performance and efficacy of interventions, treatments or injury prevention. These new innovations in performance metrics combined will inevitably enhance the capacity to evaluate changes in performance to such an extent that could aid the identification of doped athletes through "intelligent anti-doping" (i.e., targeted anti-doping testing using performance metrics). There is also the opportunity to use this real-time technology to advance broadcasting of sporting events with the transmission of real time performance metrics and in doing so enhance the level of entertainment, interest and engagement of enthusiasts in the broadcast and the sport.

NEW FRONTIERS IN ANTI-DOPING – FROM BIOMARKERS TO DETERRENCE

Nenad Dikić [1,2], Marija Andjelkovic [1,3], Milica Vukašinović Vesić [1].

Antidoping agency of Serbia[1], Faculty of Physical Education and Sports Management, Singidunum University[2], College of Sports and Health, Belgrade[3]

Abstract

Biomarker profiles could be objective indicator of a biological state. There are many novel findings of genome, proteome, metabolome which could improve detection, as well as alternative biomarkers: ironomics (hepcidin), miRNAs, membrane storage lesions (PS expression), plasticizers, etc. All those innovations are critical to advancing antidoping and anticipate future doping threats. Results in this filed improved collaboration and cooperation among stake holders and in the same time become new deterrence for cheating athletes. Longitudinal studies with steroid biomarkers have been to identify the effects of testosterone, other medications and pregnancy and soon showed value by striping dozens of medals after retesting of samples from former Olympic games. That also remind us again that collecting the sample at the right time is imperative to having effective direct and indirect detection methods. Although urine and blood are the gold standard, complementary methods for collection of alternative matrices can provide advantages for ease of collection, be less invasive for athletes, analytical specificity for some prohibited substance classes, and in the same time raise deterrence. All other achievements in antidoping defined by Code with these new approaches discouraging cheating athletes through instilling doubt or fear of the consequences.

CURRENT ISSUES OF THERAPEUTIC USE EXEMPTION (TUE): PRACTICE, PROBLEMS AND PERSPECTIVES

Viktoriya Badtieva

Chair of TUE Committee of RUSADA, Russia's anti-doping agency; Prof. Sechenov University, Moscow, Russia

Abstract

Athletes get sick, it's a fact. Both beginners and high-level athletes participating in the most serious competitions are sick. That's very important for sport physicians to treat an athlete according to the protocols and standards of the best medical practice and always in accordance with the idea that an athlete's health is paramount and in case of a disease, a TUE of prohibited substances is the only legal method of treatment for an athlete.

In recent years the number of requests for a TUE around the world has been steadily increasing. In Russia there is also a growing number of applications but it is small in comparison with other countries. The relatively low number of TUE applications in Russia may reflect the fact that the majority of Russian physicians involved in sport did not have enough special knowledge and information about the TUE process. However, this issue is not only a Russian problem. All of the reasons for TUEs rejection can have extremely negative consequences for the career of those professionally involved in sport, so low awareness of medical personnel may lead to the imposition of sanctions against honest and conscious athletes.

In order to defend athletes from disciplinary action or punishment due to failure or unintended consequences of poorly or non-informed physicians, it is essential to introduce special educational programs for physicians practicing sports medicine.

Key words: Therapeutic Use Exemption, TUE, sport medicine, doping, prohibited substances.

Program

5.15 – 16.30	Session 9: New technology in sport medicine

Chairs: Goran Vukomanović (Serbia) and Nael El Shal (UAE) / TBD

Time	Topic	Lecturer
15.15 – 15.35	HUMEDS mobile ECG	Goran Vukomanović (Serbia)
15.35 – 15.55	ACE and ACTN3 genes polymorphisms among elite male Serbian athletes	Tijana Durmić (Serbia)
15.55 – 16.15	Multi – modality approach to the diagnosis and management of muscle injuries Contemporary Methods of Physical Therapy & Latest Apparatus Shockwave	Nael El Shal (UAE) Milan Ilić (Serbia)
16.15 – 16.30	Panel discussion and questions	

ACE AND ACTN3 GENES POLYMORPHISMS AMONG ELITE MALE SERBIAN ATHLETES

Tijana Durmić

Institute of Forensic Medicine, School of Medicine, University of Belgrade, Serbia

Abstract

Elite sport performance, represents a complex phenotype, composed of various complicatedly intertlaced biological traits, some of which are manifested at the physiological level (state of the musculosceletal, cardiovascular, central nervous, pulmonary or even immunological system), while others are expressed as psychological traits (dedication, motivation, perseverance, diligence etc). All these traits lead to adaptive changes in the cardiovascular system whose magnitude can also depend on the genetic predisposition.

The aim of this study was to determine clinical signifficance of association between polymorphisms in ACE and ACTN3 genes and parameters of heart morphology and function after prolonged and intensive physical activity in elite athletes involved in different types of sports.

Athletes were divided into three groups: sprint/power; endurance and mixed sports. After anthropometric measurements, physical examination and echocardiographic evaluation, they were exposed to the cardiopulmonary exercise testing. Control group consisted of similar age, sedentary individuals, who died violently. Both groups were analysed for functional variant alleles in ACE and ACTN3 genes.

Type of sport significantly affects not only on anthropometric characteristics, but also on the grade and specificity of examined adaptive cardiovascular changes. Athletes from a mixed sports have the most prominent heart work efficiency. Multivariant statistic analysis (PCA) showed that, in males, predominant type of sport, but not the genetic predisposition, have the influence on the coadaptation of the complex features, while, in females, analysed polymorphisms in interaction with the type of sport are

significantly associated with the examined cardiovascular adaptive changes.

Effects of genotype, predominant type of sport and its interactions on morpho-functional adaptive cardiovascular changes could use in better understanding of not only „athlete's heart", as a clinical phenomenon, but also of sudden cardiac death in elite athletes.

Keywords: ACE; ACTN3; elite athletes; gene polymorphisms; physical performance, athlete's heart

CONTEMPORARY METHODS OF PHYSICAL THERAPY & LATEST APPARATUS SHOCKWAVE

Milan Ilić

Belgrade, Republic of Serbia

Abstract

Shockwave therapy is a modern, non-invasive method for rehabilitating patients with radial waves. Extremely effective in problems such as painful shoulder, tennis elbow, back pain, jumping knee or Achilles tendon inflammation, as well as bone thickening problem. Shockwave is an acoustic wave that transmits high energy to painful and fibrous or myosclerotic tissues with subacute, subchronic and chronic conditions. Shockwave therapy is used in conditions such as: painful shoulder, tennis elbow, pelvic and hip pain, jumping knee, back pain, bone thickening, Achillodynia - painful Achilles tendon conditions.

ARP WAVE

ARP Wave accelerates rehabilitation process and enables faster recovery of professional athletes and their return to the field.

ARP Neurotherapy is an exercise system that uses ARP waves and a maximum active motion range to accelerate the natural (biological) recovery processes.

The ARP concept is based on the application of a neuro-impulse and the whole area is called neurotrherapy. ARP wave is used for joint problems, arthritis, arthrosis, tendinitis and all other inflammatory processes. It is used in the quicker repair of fractures, back pain, Multiple Sclerosis, problems with the dorsal knee as well as in Osgood Shlater, plantar fascitis and all types of acute injuries (contusion, distortion, luxation, rupture, etc.)

EPTE Percutaneous electrolytic therapy

Percutaneous electrolytic therapy EPTE represents the latest revolutionary technique in the treatment of tendinopathy. Therapy with percutaneous electrolysis therapy involves the application of a modulated electrical flow directly to damaged soft tissue over the acupuncture needle, causing the tissue recovery.

HIGH POWER LASER - HILT

HILT Laser Treatment is the latest laser therapy that shortens the time of rehabilitation, generates thermal effects and almost at the same time affects the pain in the joints and soft tissues.

Indications for HILT laser treatment are:

Tendinitis

Epicondylitis

Tendinitis Achilles tendon

Plantar fascitis

Tibiotaxial distortion

Stretching muscles

Osteoarthritis

Carpal tunnel syndrome

Bursitis

Cervicobrachialgia

TECAR

Tecar therapy is performed by treating the injured place with a biocompatible radial energy that accelerates metabolic processes at the cellular level and increases the natural energy of the tissue being treated, thus stimulating natural self-inflammatory processes as well as anti-inflammatory processes.

CRYOULTRASOUND

Crioultrasound is a medical device unique in its kind, based on the synergy between cryotherapy and ultrasound therapy.

Simultaneous use of these two techniques increases the therapeutic effects by eliminating the complications arising from the heat of ultrasound. This allows the therapist to use Crioultrasound both in acute trauma and inflammation, as well as in chronic conditions. produces a strong analgesic and anti-inflammatory effect on treated tissues.

Program

16.30 – 18.00	Session 10: FIFA panel & Closing

Chairs: Yacine Zerguini (UAE) and Michiko Dohi (Japan)

Time	Topic	Lecturer
16.30 – 16.50	Screening U17 African players prior to the CAF Championship 2019. Age determination by MRI of the wrist in African football players: Reliability of MRI controls	Yacine Zerguini (Algeria)
16.50 – 17.10	PCMA – Standard screening of professional players Sport injuries – operative treatment, results / experience	Brajesh Mittal (India) Miroslav Milankov (Serbia)
17.30 – 17.50	Guideline of training during pregnancy and postpartum for early RTP in elite athletes	Michiko Dohi (Japan)
17.50 – 18.00	Panel discussion and questions	Zoran Lakočević (Serbia) Slobodan Branković (Serbia)

GUIDELINE OF TRAINING DURING PREGNANCY AND POSTPARTUM FOR EARLY RTP IN ELITE ATHLETES

Michiko Dohi

Medical Center, Japan Institute of Sports Sciences, Japan Sport Council, Tokyo, Japan

Abstract

Recently, female elite athlete's sport carrier is getting longer than before because of development of injury & illness prevention and improvement of their environment of sports. Consequently, some female athletes desire to continue their sport's carrier after having baby and RTP training during their pregnancy and after delivery is one of issues in female athletes. However, proper training during their pregnancy and after delivery is still unknown or not established well. To make the current "return to play" training guidelines for female elite athletes during their pregnancy and postpartum.

We have followed 6 athletes during pregnancy and postpartum. Through our experiences of these 6 athletes, we understood that their pregnancy course was very individual, they were not ready to do training at all and they must regain basic movement after baby delivery. Finally, we concluded that paying much attention to health of both mother & baby and a safe delivery during pregnancy and multidisciplinary measurement & evaluation of athletes after delivery of baby are the most important for early RTP.

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