CRNOGORSKA SPORTSKA AKADEMIJA
MONTENEGRIN SPORTS ACADEMY

MSA BUDVA 2018

MSA Conference 2018

15th International Scientific Conference on

Transformation Processes in Sport

SPORT PERFORMANCE

BOOK OF ABSTRACTS

12th - 15th April 2018, Budva - Montenegro

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15th International Scientific Conference
on Transformation Process in Sport "Sport Performance"

MONTENEGRIN SPORTS ACADEMY

12 – 15 April 2018, Budva – Montenegro

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Welcome

Dear colleagues and friends,

on behalf of the Montenegrin Sports Academy (MSA), I am aware of the distinguished honor to announce Budva, the metropolis of Montenegrin tourism, as the host city of the 15th International Scientific Conference on Transformational Processes in Sport, entitled "Sport Performance". I also wish to welcome academicians and students from all over the world on 12 to 15 April, 2018.

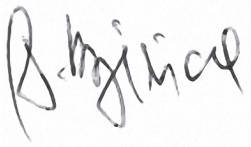
Since the first event in Bar in 2003, the MSA Conference has been a huge success, providing a great opportunity to promote and develop Sports Sciences through networking, study and research. This year, under the traditional patronage of the Government of Montenegro and in collaboration with Faculty of Sport and Physical Education and Faculty fo Economics at University of Montenegro as well as Faculty of Sport and Physical Education at University of Novi Sad, Faculty of Sport and Physical Education at University of Sarajevo, Montenegrin Olzmpic Commettee, Faculty of Sports Sciences at Université Nice Sophia Antipolis, Faculty of Science of Sport and Physical Education at University of Coimbra, Science and Research Centre Koper, Faculty of Health Sciences at University of Primorska, Sports University of Tirana, Asian Exercise and Sport Science Association and European College of Sports Science, we have put together a high profile scientific programme with plenary and parallel sessions (oral and poster), accompanied by social events and free time to discover and enjoy the amazing city of Budva. The upcoming conference aims to contribute to the development of global approaches in the different specialized areas and to provide an even broader view of Sports Sciences. Hopefully, sport scientists will be able to find the best paths through the field.

We are confident you will enjoy the whole conference experience, the sharing of knowledge and contribution this will make to our institution and to our field of study and work.

Budva is an open city: open to the various people, to various cultures, to the world and to science. What better place in which to join forces in developing sport performances.

See you to Budva and Adriatic Coast!

Prof. Duško Bjelica, PhD
Conference President



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Invited Presentations

PROMOTION OF EXERCISE INTERVENTIONS IN CHILDREN: IS THERE A CRITICAL PERIOD?

Madic, D.[1], **Popovic, B.**[1], **Trajkovic, N.**[1]
[1]*University of Novi Sad (Novi Sad, Serbia)*

Introduction: Implementation of exercise interventions during childhood could be a "window of opportunity" for healthier and better quality of life in later ages. The primary aim of this paper was to present the rationale for exercise interventions in children. The secondary aim was to promote exercise program throughout its content and results. Concerning the first aim we have included the newest literature linking physical fitness and physical activity with different risk factors among children. The health benefits of increased physical activity and fitness in children are well documented. There is a large potential for prevention of obesity, and cardiovascular disease with exercise interventions and increased physical activity as one of the key actions that should be initiated. According to the reviewed papers our research group consider preschool population as a critical period in order to maximize health promotion and chronic disease prevention. Additionally, we have followed children involved in organized developmental gymnastics programs in the past ten years. Children were tested for health- and skill-related fitness: strength, coordination, speed, flexibility, precision, balance; Bone density; Cognitive abilities: Raven's Coloured Progressive Matrices, problem solving and calculation in Mathematics; Morphological characteristics: Body mass, BMI, skinfold and circumference measures; Aberrant behaviour. Based on the obtained results during past years, the groups that were involved in developmental gymnastics programs showed better results compared to control groups. Although the studies have indicated the inevitable involvement of professional staff into physical education and exercise in preschool and early school age, it is still not the case in most of the countries. Instead of conclusion we appeal for promotion of physical activities organized by physical education teachers within the day-care setting and schools because of the potential wide scale public health benefits.

YOUTH SOCCER COACHES DECISIONS: THERE IS A BIOLOGICAL-RELATED ISSUES BIAS?

Figueiredo, A.[1], **Goncalves, E.**[1], **Sarmento, H.**[1]
[1]*University of Coimbra (Coimbra, Portugal)*

Introduction: There is a strong link between maturational development and growth and performance. Organizing age-groups using the criteria of chronological age leads to a big difference in size, composition and performance, and adolescence is the period when these differences are more visible and the ages between 13 and 15 years old seems to be the most heterogeneous period. In the same age group, the subjects maturationally more advanced are in general heavier and taller than their peers of the same chronological age since childhood until the end of adolescence. However, adults don't usually show the same differences when the same comparison is made. This situation can be explained by the catch up phenomenon in the late matures

individuals. The initial process to identify promising athletes is multidimensional and the literature in the area show that growth and maturation are two important concepts to better understand the identification, selection, and development processes of young athletes. Usually young players tend to be above the mean for height and mass and tend to be advanced in biological maturity status with increasing age during adolescence and in elite development programs. Worst results is been reported for body size and functional performance in young soccer players who were not selected to play in more demanding competitions or who dropped out from sport. The same trend was visible in academy players to whom were not proposed a professional contract. Despite of the lack of evidence that the anthropometrical, maturational and physical characteristics in the beginning of the process are not direct associated with the exceptional performance in the adulthood it is of interest to understand that these indicators may open the doors of academies and others training centers of excellence promoting better conditions and better coaching to the selected players. Recently were not found decennial differences in the entrance profile of soccer players in a club academy. This finding suggests that the sport (soccer) promoting strategies are being maintained despite of the increased demanding in the anthropometric characteristics of professional players and demands of the actual professional soccer competitions.

ASSESSMENT OF NEUROMUSCULAR QUICKNESS THROUGH ISOMETRIC FORCE PULSES.

Uygur, M.[1]
[1]*Rowan University (Glassboro, NJ, USA)*

Introduction: Recent evidence suggest rate of force development scaling factor (RFD-SF) as a reliable measure of neuromuscular quickness that is sensitive enough to detect training adaptations and differences among populations (e.g. healthy and neurological) (1). RFD-SF is considered as functionally more relevant to athletic performance that requires quick submaximal force generation than the other commonly used measures such as peak fore (PF) or peak rate of force development (RFD). Moreover, unlike PF and RFD, RFD-SF is independent of muscle size, strength, and gender. Considering the importance of the ability to generate quick submaximal forces followed by quick muscle relaxation in athletic activities that require consecutive agonist and antagonist contractions, there is a need to develop a similar measure that quantifies the ability to quickly relax a muscle contraction. Within this seminar, I will present the findings of couple studies that aim to 1-) develop rate of force relaxation scaling factor (RFR-SF), test it's reliability, and compare it's values across various muscles, 2-) compare the ability of RFD-SF and RFR-SF in distinguishing neuromuscular quickness properties of endurance and power athletes, and 3-) study the functional relevance of the RFD-SF and RFR-SF. The rate of force development and relaxation scaling factors are obtained from the kinetic analysis of brief isometric force pulses performed to various submaximal intensities ranged between 20-80% of the maximum voluntary contraction (MVC). Subjects are instructed to produce each force pulse as fast as possible without paying attention to the accuracy of pulses and quickly relax thereafter. The peak rate of force development (RFD), peak rate of force relaxation (RFR), and peak force (PF) is obtained for each force pulse. The slope of the regression line drawn between RFD and PF represents rate of force development scaling factor (RFD-SF) while the slope of the regression line between RFR and PF represents rate of force relaxation scaling factor (RFR-SF) (3). Several muscles of both upper and lower extremities are tested. Both RFD-SF and RFR-SF can be reliably assessed from the isometric brief force pulses performed to various submaximal force levels. Moreover, comparable values among the tested muscles of various maximal capacities indicate that both of these measures are robust measure of neuromuscular system. Both measures could be different between power and endurance trained athletes. The findings of the aforementioned studies further support

RFD-SF and RFR-SF as a robust measure of neuromuscular quickness. Future studies are needed to expand this measure in various populations that might include athletes of different physical and neuromuscular properties. References: Bellumori et al., 2011; Djordjevic and Uygur, 2017; Haberland and Uygur, 2017.

ASSESSMENT OF THE NEUROMUSCULAR CAPACITIES THROUGH THE FORCE-VELOCITY RELATIONSHIP.

Bozic, R.P.[1]
[1]*Serbian Institute of Sport and Sports Medicine (Belgrade, Serbia)*

Introduction: For successful performing of various functional movement tasks from human daily life or sport, muscle mechanical capacities to produce high levels outputs of force (F), velocity (V) or power (P) are essential. However, testing of muscle capacities has been routinely performed under a single pre-defined movement condition that allow obtaining single outcomes such as, the jump height, exerted force, or cycling frequency. As a result, selectively assessment of the partly independent muscle capacities for producing maximal force (F0), velocity (V0) or power (PM) could not be possible through a single outcome since it changes substantially with load and movement velocity due in part F-V and P-V relations. This certainly leads to a fundamental problem in the contemporary literature and practice regarding both the testing procedures and the interpretation of results. A promising solution of the discussed problem could be based on a number of recent research focused upon the modelling F-V relationship of muscular system with performing different functional tasks or sport activities under two or more loading conditions. Namely, the loaded functional multi-joint movements (e.g., jumping, walking, running, cycling, lifting, throwing) typically display a strong and linear F-V relationship of the tested muscles. It allows to determine the distinctive muscle capacities such as maximum F, V and P. The present study is focused to provide summary of theoretical and practical definitions for the main variables as well as guides to practitioners and researches interested in implementing F-V modelling approaches. Furthermore, the study discusses recent researches and properties of F-V relationship parameters obtained from various functional tasks. Finally, a theoretical and practical implications and future challenges would help further development of these simple approaches for testing of the neuromuscular capacities. References: Jaric, S. (2015). Int J Sport Med. 36(9):699-704. Bozic RP and Berjan Bacvarevic B (2018). Mont J Sport Sci Med. 7(1), Ahead of Print.

NEUROCOGNITIVE FUNCTIONS INVOLVED IN THE REGULATION OF EFFORT DURING ENDURANCE EXERCISE: A DUAL-MODEL PERSPECTIVE.

Radel, R.[1]
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Introduction: The regulation of effort during prolonged physical tasks not only has great importance in the performance of professional athletes, but also in everyday activities of all individuals. The problem can be assimilated to a trade-off between the costs and benefits of effort exertion, in which peripheral signals of fatigue, pain and energy consumption have to be compared to the values, the motives, and the utility of the task (Croxson, Walton, O'Reilly, Behrens, & Rushworth, 2009; Rudebeck, Walton, Smyth, Bannerman, & Rushworth, 2006). The objective of my communication is to provide a theoretical proposition of how these different types of information are integrated in the brain to regulate physical effort. In other words,

a model will be proposed to identify the cognitive functions and brain regions/networks involved in this regulatory process. Specifically, a dual model is proposed in which effort would be constantly regulated in an automatic fashion at a subcortical level but could also be sporadically regulated in a top-down manner by a controlled route when the automatic response is considered as inappropriate. Such conflicts may arise because it is presumed that each regulatory route considers different types of information, with rather unconscious information for the automatic route (e.g., peripheral afferent feedback, unconscious reward) and conscious information for the controlled route (e.g., subjective feelings, task expectations, conscious rewards). The detection of conflict by a supervisory system would require cognitive resources by relying on effortful fronto-executive functions such as sustained attention and inhibition (Kerns et al., 2004). This framework therefore implies that while some conditions are favourable to a bottom-up regulation of effort, others are rather favourable to a top-down regulation of effort depending on the availability of fronto-executive resources. In consequence, the different types of information may not always have the same impact on physical effort. I will review the evidence for this model and also present preliminary data testing this model. References: Croxson, P. L., Walton, M. E., O'Reilly, J. X., Behrens, T. E. J., & Rushworth, M. F. S. (2009). Effort-Based Cost-Benefit Valuation and the Human Brain. Journal of Neuroscience, 29(14), 4531–4541. Kerns, J. G., Cohen, J. D., MacDonald, A. W., Cho, R. Y., Stenger, V. A., & Carter, C. S. (2004). Anterior Cingulate Conflict Monitoring and Adjustments in Control. Science, 303(5660), 1023–1026. Rudebeck, P. H., Walton, M. E., Smyth, A. N., Bannerman, D. M., & Rushworth, M. F. S. (2006). Separate neural pathways process different decision costs. Nature Neuroscience, 9(9), 1161–1168.

SPORT PARTICIPATION AMONG ALBANIAN CHILDREN LIVING IN BALKAN.

Jarani, J.[1], **Spahi, A.**[1], **Muca, F.**[2]
[1]Sports University of Tirana (Tirana, Albania), [2]Albanian Sport Science Association (Tirana, Albania)

Introduction: Participation to sport activities plays a crucial role in the health of children and as a tool to combat overweight and obesity. It was conducted a research in Balkan (Albania, Kosovo, FYROM and Montenegro) among Albanian children about participation to sports. The Physical Activity Questionnaire for Children (PAQ-C) was used as a means for children to self-report their own sport participation over the past seven days. Janz et al. (2008); Kowalski et al. (1997). In total there were 18,460 children (9266 boys and 9194 girls). Out of the total number of children, 15516 children living in urban areas (7753 boys and 7763 girls) and 2944 children living in rural areas (1513 boys and 1431 girls) participated in the study. The most-practiced sport of Albanian children in the Balkans is football with a prevalence of 57%, of which 89.9% are boys and 24% girls. The second most exercised sport is volleyball with 40% prevalence, from which 35.8% are boys and 44.3% are girls. The prevalence of exercise of martial arts sports by primary school children is 15.3% whereas those of lower secondary education are 16%. As far as volleyball is concerned, 30.2% of primary education children and 53.6% of lower secondary education exercise it. The more sport practiced by Albanian children living in the Balkans is football, and the least exalted are martial arts. More football is used by children of the age group 13.1-13.5 years with prevalence (67%), and less are exercised by children of the age group 6.1-6.5 with prevalence (42%). This data will be a useful tool in order to create politics about motivation children in sports participation. References: Kowalski K C, Crocker P R E and Faulkner R A (1997). Validation of the Physical Activity Questionnaire for Older Children., 9, 174–186. Janz K F, Lutuchy E M, Wenthe P and Levy S M (2008). Measuring activity in chil-dren and adolescents using self-report: PAQ-C and PAQ-A., Med Sci Sports Exerc 40(4), 767–772. URL: http://dx.doi.org/10.1249/MSS.0b013e3181620ed1

OPTIMIZING TRAINING FOR MASTERS SWIMMERS.

Casaru, C.[1]
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Introduction: The number of Masters swimmers has increased over the past years. This is largely due to the increasing number of baby boomers (people born between 1946 and 1964, becoming senior citizens). According to the Census Bureau, in 1994 the ration of elderly in the United States was one in eight and will increase to one in five by 2030. Currently, the numbers of memberships with United States Masters Swimming (USMS) reached over 50,000 members ranging in age from 18 to 104. With the number of elderly set to rise in the next years it is important to look at different types of training methods used for Masters swimmers in order to meet the training demands of this group of athletes. The tutorial is addressing the following training factors: 1) Factors Affecting Swimming Performance: With age many physiological variables decrease: maximal oxygen uptake (VO2max), muscular strength, and blood pressure increases. Muscle strength generally reaches peak at age of 25-35 then declines at a rate of 1% per year until the age of 70. 2) Methods of Predicting Performance: The general exercise economy does not seem to be negatively affected during aging. Stroke length decreases from 50-65 years old and then begins to level off after the age of 65. Stroke frequency remains the same from 50-65 years old and then begins to show a decline after age 65. 3) Types of Training: Masters swimmers training should focus on aerobic and anaerobic endurance training while they are in their 20s, 30s and 40s and switch the training focus towards anaerobic training (sprints and strength and conditioning) as they pass the age of 40. The purpose of this tutorial is to discuss the optimal training methods for the older athlete. When one is designing a training protocol for a Master swimmer the designer must place emphasis on strength training, and flexibility of the Masters athlete. While designing a training program for Masters swimmers coaches must also understand the Masters' athlete athletic and ability background. References: Donato, A. J., Tench, K., Glueck, D.H., Seals, D.R., Eskurza, I. and Tanaka, H. (2003). Declines in physiological functional capacity with age: a longitudinal study in peak swimming performance. Journal of Applied Physiology 94, 764-769. Fleg, J.L. and Lakatta, E.G. (1988). Role of muscle loss in age-associated reduction in VO2 max. Journal of Applied Physiology 65, 1147-1151. Fleg, J.L., Morrell, C.H., Bo,s A. G., Brant, L.J., Talbort, L.A., Wright, J.G. and Lakatta, E.G. (2005). Accelerated longitudinal decline of aerobic capacity in healthy older adults. Circulation 112, 674-682. Marcell, T.J., Hawkins, S.A., Tarpenning, K.M., Hyslop, D.M., and Wiswell, R. (2002) Longitudinal Analysis of Lactate Threshold in Male and Female Master Athletes. Medicine & Science in Sports & Exercise 35, 810-817. Tanaka, H. and Seals, D.R. (2008). Endurance performance and Masters athletes. Journal of Physiology 586. 1, 55-63.

KINESIOLOGY IN ERGONOMICS: FOCUS ON BACK PAIN.

Sarabon, N.[1,2,3]
[1]*University of Primorska, Faculty of Health Sciences (Koper, Slovenia),* [2]*University of Primorska, Andrej Marusic Institute (Koper, Slovenia),* [3]*Science to Practice Ltd. (Ljubljana, Slovenia)*

Introduction: Kinesiological interventions, including numerous exercise-based programs and biomechanical evaluations, add importantly to holistic measures, taken to promote safer work, more active lifestyle and reduce sick-leaves. The aim of this presentation is to introduce the role of kinesiology in multidimensional ergonomic interventions. Several systematic literature reviews on the respective field were conducted in past years and were regularly updated. Additionally, findings from some of our trials will be presented.

Musculoskeletal and cardiovascular systems are the most affected by sedentary work, which prevails among our society. Along with the ergonomic interventions (e.g. providing ergonomic office furniture), performing exercise within the workday and during free time is both essential to minimize cardiovascular disease risk (Reed, 2017) and reduce the pain syndromes (Moreira-Silva, 2016). Accessories to promote the activity during work include sit-stand tables, cycle desks and treadmills (Shrestha et al., 2016). People performing heavy physical work are at a higher risk for acute injuries and should perform specific type of resistance and stability exercise to counteract this. In individual approach, a thorough anamnesis and clinical evaluation should be performed prior to exercise prescription. Several of our trials confirmed negative effects of various workplaces on neuromuscular function and muscle performance generally, as well as, on trunk/back specifically. Interventions targeted at working populations should include carefully chosen exercise-based content, alongside nutritional, psychological, organizational and ergonomics measures. Kinesiology plays an important role in preventive diagnostic procedures, that help determine people at risk and design countermeasures specifically for them; involving employers, employees and train the trainer approach. Future research should test more interventions, that are cost-effective and easy to implement, while the importance of performing physical activity within and outside the workplace should be actively promoted. An overview of our current research and development projects on the field will be presented. References: Moreira-Silva I, Teixeira PM, Santos R, Abreu S, Moreira C & Mota J (2016). Workplace Health & Safety, 64 (5), 210-222. Reed JL, Prince SA, Elliott CG, Mullen KA, Tulloch HE, Hiremath S, ... & Reid RD (2017). Circulation: Cardiovascular Quality and Outcomes, 10 (2), e003516. Shrestha N, Kukkonen-Harjula KT, Verbeek JH, Ijaz S, Hermans V, Bhaumik S (2016). Cochrane Database Syst Rev. 17 (3), CD010912.

SKELETAL MUSCLE MECHANICAL CONTRACTILE PROPERTIES: FROM CHILDHOOD TO LATE ADULTHOOD.

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[1]*Science and Research Centre Koper (Koper, Slovenia)*

Introduction: While there are numerous data on the fibre type composition of skeletal muscle in adults, little is known about the changes in fibre type composition and contractile properties in muscles during maturational growth in boys and girls. Although muscle biopsy data of older adults are available at least for vastus lateralis (VL) muscle there are strong indications that age-, and physical inactivity-related muscle wasting is not symmetrical (Šimunič et al., 2017). Even more, master athletes maintain high levels of physical activity; however, they too suffer from an age-related decline in skeletal muscle function (Šimunič et al., 2009). Using noninvasive tensiomyography we measured contraction time (Tc), an indirect estimate of the VL type I myosin heavy chain proportion (Šimunič et al., 2011), to assess the longitudinal changes of the biceps brachii (BB), biceps femoris (BF), gastrocnemius medialis (GM), VL, and erector spinae (ES) muscles in children (N=107). The children were 9 years at the start of the study and returned yearly for 5 follow-up measurements till the age of 14 years. The same muscles were assessed also in older non-athletes (N=379) and muster athletes (N=327). The ES has the shortest Tc and the BF has the longest Tc. The VL and ES of boys were slower (shorter Tc) than those from girls. When applying the relationship between proportion of MHC-I and Tc established in adults to the children TMG data, we found a slow-to-fast transition in the VL between at least the age of 6 and 10 years, when it had stabilized to adult proportions. Regular participation in sport was associated with a faster BF, but not in VL. In adults, we found age-related slowing of all observed muscles, where endurance master athletes had longest Tc than non-athletes, while power master athletes had the shortest Tc. Furthermore,

our data revealed longer Tc in endurance master athletes than in non-athletes with age, indicating that preferring regular endurance sport activity accelerates the age-related slowing of skeletal muscles. Our data represents a first non-invasive, although indirect, indication of the developmental trends in changes in muscle fiber type composition in children, adult non-athletes, power- and endurance- master athletes, where master athletes present an unique human research model to disentangle the effects of disuse and co-morbidities from ageing per se. References: Šimunič B, Degens H, Rittweger J, Narici MV, Mekjavić IB, Pišot R. (2011). Med & Sci in Sports & Exerc, 43(9), 1619-1625. Šimunič B, Degens H, Završnik J, Koren K, Volmut T, Pišot R (2017). Int J Sports Med, 38(9), 659-665. Šimunič B, Pišot R, Rittweger J (2009). Proceedings book. University of Novi Sad, Faculty of Sport and Physical Education, 185-190.

Oral Presentations

Anthropology

STATURE AND ITS ESTIMATION UTILIZING ARM SPAN MEASUREMENTS OF BOTH GENDER ADOLESCENTS FROM SOUTHERN REGION IN KOSOVO.

Arifi, F.[1,2], **Sermaxhaj, S.**[1,3], **Gardasevic, J.**[1], **Alaj, I.**[1], **Metaj, Z.**[1,2]
[1]University of Montenegro (Niksic, Montenegro), [2]AAB College (Prishtina, Kosovo), [3]Universe College (Prishtina, Kosovo)

Introduction: This study is based on measurements of Southern region Kosovan adolescents. The aim of this study was to examine the stature of adolescents from Southern region as well relationship between arm span and stature in both Kosovar genders. Methods: A total measured subject participated in this research was 225 out of which (105 girls and 120 boys), females average of age is 18.36±0.50 years old (range 18-20 years) and for male 18.40±0.55 years old (range 18-20 years).The anthropometric measurements were done by trained people and were taken according to the ISAK manual. Relationship between stature and arm span has been analyzed by the simple correlation coefficient at a 95% confidence interval. The linear regression analysis was carried out to examine extent to which arm span can reliably predict of stature. Statistical importance was placed at level $p<0.05$. Results: As a result anthropometric measurements for both sexes showed that the average of stature for boys adolescents from Southern region are 178.60±5.73 centimeters and have the arm span average of 180.92±6.92 centimeters, while girls from Southern 165.33±4.45 centimeters tall, and have the arm span average of 165.60±6.03 centimeters. Discussion: The results have shown that the arm span was estimated as a reliable indicator of stature assessment to the both genders adolescents from Southern region of Kosovo population. This study also confirms the necessity for developing separate height models for each region in Kosovo. References: None.

Biomechanics

DETERMINATION OF CHANGES IN RIDER'S TRUNK, HEAD ORIENTATION, AND HARMONIC INTERACTION AFTER HORSEBACK RIDING TRAINING USING INERTIAL MEASUREMENT UNITS.

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Introduction: Maintaining a convenient posture and harmonic interaction with the horse are both active and reactive movements for a smooth riding skill. A good posture enables the rider to control a horse's speed and direction without interfering its balance (Lovett et al., 2005). Harmonic movements of the rider, on the other hand, improves the comfort of riding at any speed and decreases injury risk for

both the rider and the horse (Greve & Dyson, 2013). As well as learning these skills are the utmost importance for beginner riders, quantifying the changes gives critical information to the coaches and researchers. Methods: Trunk and head orientation, the harmonic interaction between horse and the rider of ten 12-14 years old beginner level adolescents (5 male – 5 female) were investigated before and after 12-week (50 min. and twice in a week) horseback riding training sessions using four 6-DOF inertial measurements units (IMU). Trunk and head orientation of the participants during walk and trot were calculated using accelerometer + gyroscope data obtained from IMUs placed on helmet and safety vest. To fuse data, complementary filtering method was used. Acceleration peaks of data obtained from IMUs placed on the bottom side of the saddle and lower back of the participants was used to observe harmonic interaction. Results: The results of the study indicated that both the trunk and the head orientation of the participants had improved in terms of horse riding skill after training sessions. Additionally, decreased acceleration and impact peaks were displayed on the accelerometer data indicating more harmonic interaction and smooth riding. Discussion: In conclusion, the improved horseback riding skills were expected results of this study. On the other hand, given clear and processible data showed that IMUs have a great potential for quantifying movements in horseback riding, which gives researchers an opportunity to analyze human and horse's motion on the field without limitations of laboratory conditions. References: Greve, L., & Dyson, S. (2013). The horse–saddle–rider interaction. The veterinary journal, 195(3), 275-281. Lovett, T., Hodson-Tole, E., & Nankervis, K. (2005). A preliminary investigation of rider position during walk, trot and canter. Equine and Comparative Exercise Physiology, 2(2), 71-76.

KINEMATICAL DIFFERENCES OF HANDSTAND TECHNIQUE.

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Introduction: The aim of this study was to compare the kinematic parameters which define the handstand technique by the certain phases of its execution between different levels of quality in relation to a handstand model of an elite gymnast. Methods: The participants were five second-year students of the Faculty of Kinesiology and have already completed the Artistic Gymnastics 1. The participants were selected by choice, after being evaluated from 1 to 5 grades by three gymnastics experts. Different handstand techniques were compared with a model of handstand which was performed by an elite gymnast. The sample of variables consisted of kinematic parameters that were extracted from the key positions of certain handstand phases. Kinematic parameters were extracted with the program package MVN Studio BIOMECH Software (Xsens North America Inc.), and their processing was done by the ANOVA analysis. Results: The results show that there was no statistically significant distinction between the kinematic variables of the participants and the model of the gymnast, but differences were visible in the descriptive parameters. Also, they were different on a scale of 1 to 5 grades, as estimated by the gymnastics experts. Discussion: A handstand is considered as a basic acrobatic element which is an essential part of a large number of complex elements on gymnastics apparatus. It is of importance to mention that methodical and didactical principles need to be followed during learning and mastering of the technique (Uzunov, 2008; Živčić Marković & Krističević, 2016). Although acquired data indicates that there is no statistically significant distinction between the execution of participants and the model of handstand technique, while descriptive results display large differences in quality of the technique. Other investigations show that the most difference was in the time needed for execution and angles in

shoulder joints during all phases of handstand execution (Kerwin & Trewartha 2001; Kochanowicz et al. 2015). References: Kerwin DG, Trewartha G (2001). Strategies for maintaining a handstand in the anterior-posterior direction, Med Sci Sports Exerc, 33(7), 1182-1188. Kochanowicz A, Kochanowicz K, Niespodziński B, Mieszkowski J, Biskup L (2015). The level of body balance in a handstand and the effectiveness of sports training in gymnastics, Balt J Health Phys Act, 7(4), 117-124. Uzunov, V. (2008). The handstand: A four stage training model, Gym Coach Journal, 2, 52-59. Živčić Marković K, Krističević T (2016). Osnove sportske gimnastike. [Basics of artistic gymnastics. In Croatian.] Zagreb: Faculty of Kinesiology, University of Zagreb.

DIFFERENCES IN VAULT RUN-UP VELOCITY IN ELITE GYMNASTS.

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Introduction: The aim of this study was to compare differences in run-up velocity between handspring, Tsukahara and Yurchenko entry on vault. Methods: A sample consisted of 48 jumps performed on vault, 19 handsprings, 17 Tsukahara and 12 Yurchenko entry on vault. Data were collected on a World Cup competition held in Osijek, 2017. Run-up velocity was measured by speed radar gun (Stalker ATS, S PRO II). Descriptive statistic was calculated for all variables and differences in run-up velocity were determined by one-way ANOVA and Bonfferonni post-hoc at the level of statistical significance at $p<.05$. Results: Run-up velocity at handspring entry was 8.06 m/s, Tsukahara entry 8,06, and Yurchenko entry on vault table was 7,66 m/s. ANOVA showed that exist statistical significant differences in run-up velocity between handspring and Yurchenko and between Tsukahara and Yurchenko entry. Discussion: The results of this study indicated that different entry on vault table has different run-up velocity. Investigations of run-up velocity have shown differences between vault type or entry on vault table, depending on weather are performing Yurchenko, handspring or Tsukahara vault (Sands, 2000., Veličković et al., 2011., Naundorf et al., 2008., Dolenec et al., 2006). Run-up for Yurchenko vaults was slower than in of Tsukahara and handspring vault, and the reason lies in the fact that performing round-off before the springboard and coming backward to the vault table which requires the precision of placing the hands and it's considered more difficult to perform. Also, new vault table brings new techniques and rise the vault values, so that increase complexity of second flight phase (Naundorf et al., 2008). Analysis of running velocity during ten years showed that the velocity of run-up has increased, except for Yurtchenko vault (Fernandes, et al, 2016). References: Sands WA (2000). Vault run speeds, Technique, 20, 5-8. Veličković S, Petković D, Petković, E (2011). A case study about differences in characteristics of the run-up approach on the vault between top-class and middle-class gymnasts, Science of Gymnastics, 3(1), 25-34. Naundorf F, Brehmer S, Knoll K, Bronst A, Wagner R (2008). Development of the velocity for vault runs in artistic gymnastics for the last decade, In ISBS-Conference Proceedings Archive, 1(1), 481-484. Dolenec A, Čuk I, Karacsony I, Bricelj A, Čoh M (2006). Runway characteristics of vault in women gymnastics, Kalokagathia, 3(4), 127-136. Fujihara T (2016). Revisiting run-up velocity in gymnastics vaulting, In ISBS-Conference Proceedings Archive, 34(1), 593-596. Fernandes SMB, Carrara P, Serrão JC, Amadio AC, Mochizuki L (2016). Kinematic variables of table vault on artistic gymnastics, Rev Bras Educ Fís Esporte, 30(1), 97-107.

THE EFFECT OF 14-DAY BED REST AND RECOVERY ON SKELETAL MUSCLE CONTRACTILE PARAMETERS IN YOUNGER AND OLDER SUBJECTS.

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Introduction: It is known that regular and moderate physical activity has many positive effects on health. However, for several millennia, doctors prescribed lying in bed as a treatment for managing injuries, illnesses and to enable rehabilitation. While it is known from the Hippocrates period that long-term lying in bed does not only act as a treatment agent but also has side effects, however, scientists have only begun systematically studying the negative effects of long-term bed rest since the mid-twentieth century. Long-term inactivity causes numerous physiological adjustments on all organ systems, often with negative consequences for health. While many studies investigated health effects of physical inactivity on younger subjects, little is known on older subjects. The aim of this study was to find the negative consequences on muscle contractile parameters of 14-day bed rest and the potential of supervised recovery; to compare muscle contractile properties measured with tensiomyography (TMG) after bed rest and also after rehabilitation. Methods: Sixteen older and 7 younger male subjects were exposed to 14-day horizontal bed rest, followed by 28-days of guided rehabilitation. Before (BDC) and after (BR14) the bed rest and after 14th (R+14) day of rehabilitation we measured vastus lateralis (VL) muscle contractile properties using TMG: delay time (Td), contraction time (Tc), relaxation time (Tr), maximal displacement (Dm) and calculated estimated proportion of myosin heavy chains 1 (MHC-1) (Šimunič et al., 2011). Results: Td increased at BR14 ($P=0.001$, $\eta2=0.503$) by about 15-18% with no interaction effect ($P=0.553$). Tc increased only in older group by 15% at BR14 ($P=0.063$) and remained elevated by 15% at R+14 ($P=0.001$). Tr did not change with time; however the interaction ($P=0.022$, $\eta2=0.278$) confirmed that Tr had a trend of prolongation in younger and shortening in the older, and this throughout the period from BDC to R+14. Dm increased at BR14 for 17% ($P=0.049$) in older group. Finally, we found an interaction in estimated MHC-1 ($P=0.034$, $\eta2=0.947$) that increased only in older by 19% at BR14 ($P=0.020$) and remained elevated by 15% at R+14 ($P=0.080$). Discussion: TMG is a non-invasive method that allows estimation of MHC-1 in VL (Šimunič et al., 2011). After 35-day of bed rest in young TMG revealed increase in Dm and no change in Tc of VL (Pišot et al., 2008). This study compared younger and older subjects after 14-day bed rest. Interestingly, the stated changes can occur only after 14 days of bed rest and confirmed larger effects of bed rest on older subjects, together with slower recovery after 6-7 supervised sessions. These findings have very strong clinical relevance. References: Pišot, R, Narici, MV, Šimunič, B,... and Mekjavič, IB (2008). Whole muscle contractile parameters and thickness loss during 35-day bed rest. Eur J Appl Physiol, 104(2): 409-414. Šimunič B, Degens H, Rittweger J,… and Pišot R. (2011). Med & Sci in Sports & Exerc, 43(9):1619-1625.

PERFORMANCE AND BIOMECHANICS IN WRESTLING.

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Introduction: The following thoughts aim to offer an overview of the sport of Wrestling, with a focus on the physiological and technical characteristics of a wrestler and training periodization. This latter aspect, in fact, is usually considered as decisive for the outcome of sports competitions for every athlete,

even though the purpose of a good training is creating those psycho-physical conditions at the base of all sports activities. Methods: Muscle recruitment will be analysed through the energetic demand of muscle groups during a fight. Results and discussion: There are some peculiarities associated with different muscle groups involved in a fight. Energy demand, in fact, varies depending on the stage of the match, and depending on the physiological function of the muscle. In particular, we should mention the difference between muscles responsible for holding our posture (tonic muscles) and muscles used for dynamic movement (phasic muscles). When it comes to wrestling, this assumption must be slightly adjusted: the fact that the higher relative anaerobic power is developed by the upper limbs reflects the use of the pelvic and lower limbs, more oriented to stabilization. From a metabolic point of view, this evidence involves a greater aerobic attitude by the lower limbs aimed at a better anaerobic efficiency of the upper body. This is valid for both men and women. Where significant anaerobic capacity is achieved by higher limbs, there is a greater discrepancy between elite athletes and lower level athletes. On the other, in assessing the anaerobic capacity of the lower limbs, this difference is no longer significant and does not produce any correlation between the values detected and performance efficiency. Other studies by Emerson Franchini & al. comparing top athletes with regular athletes, found that the body fat percentage is usually low for elite athletes (except for heavyweight athletes) who have higher anaerobic power on the upper part of their body. The dynamic strength (1RM) of the lower limbs is greater in elite athletes, even national athletes, than in non-élite athletes. For other values, on the other hand, there are no significant differences, in particular for the force developed during maximum or prolonged isometric contractions. References: None.

THE EFFECTS OF OVAL CHAINRINGS ON BIOMECHANICAL PARAMETERS DURING CYCLING AT VARIOUS INTENSITIES.

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Introduction: Oval chainrings have been known for over a century, yet still their usage is in minority and research is limited (Cordova et al. 2014). One of the reasons for the minimal usage might be the lack of evidence supporting the advertised benefits (Malfait et al. 2012). The main aim of this research was to study the effects of oval chainrings on biomechanical parameters at different intensities of cycling. Methods: The study included 12 well-trained cyclists (33.8 ± 6.8 years, 72.1 ± 8.4 kg, 177.5 ± 4.9 cm), with a 14-day adaptation phase in a crossover study design. After that, they performed an incremental test until exhaustion on their own bicycle (with normal and oval chainrings) with continuous recordings of pedal forces. Both sessions were identical in tests and were separated by 14 days. Pedalling effectiveness, total force and crank angular velocity variability were recorded throughout the test at various test phases using force pedals (Forped, Cycling Science, Ljubljana, Slovenia). Results: Statistical analysis showed statistically significant increase ($p < 0.01$) in crank angular velocity variation coefficient with the oval chainrings compared to circular. Other biomechanical parameters had no statistically significant differences ($p > 0.05$) between the two chainrings. Discussion: This study examined the effects of oval chainrings on effectiveness of pedalling. After a 14-day adaptation phase no significant differences were detected in pedalling effectiveness. Further examination of the data revealed high variability in response to oval chainrings with some participants responding positively and some negatively. Research on oval

chainrings needs further studies to identify cyclists with a specific pedalling technique, who could benefit from oval chainrings. References: Cordova et al., 2014 Journal of sports science & medicine 13(2): 410–16. Malfait et al., 2012. http://www.noncircularchainring.be/pdf/Appropriate non-circular chainrings.pdf (May 13, 2017).

Coaching

PRE-COMPETITIVE EMOTIONAL STATES IN DIFFERENT WOMEN'S BASKETBALL LEAGUES.

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Introduction: One of the reasons underlying the mental aspects of the athletes is that most athletes have the proper physical condition, good skills, but has only one difference - poor psychological readiness (Fronso et al., 2013). One of the factors that reduce the mental preparation of athletes are competitive anxiety that an athlete may have before the competitions. It is very important to identify and analyze emotional states before the competition, so that athletes can be prepared for the competition using not only physical but also psychological readiness (Neil et al., 2011). Methods: The study involved 71 players from the First division of the Lithuanian Women's Basketball League (FDWBL) and 100 from the Second division (SDWBL). The average age of players from the FDWBL is 22.8 years, while from the SDWBL players are 25.7 years old. The survey method was used (Emotional states assessment - SAN and Competitive state anxiety inventory - CSAI - 2) (Cox et al., 2000). The statistical analyses were performed using SPSS V21.0. Results: There is a significant difference in pre-competitive emotional states between different women's basketball league ($p < 0.01$). Players from SDWBL showed higher means in wellbeing and mood states than players from the FDWBL. Higher means in activeness was the only factor that players from the FDWBL showed higher results than players from SDWBL ($p < 0.01$). The anxiety between different women's basketball leagues has a significant difference ($p < 0.01$). Discussion: The older basketball players are particularly conscious and responsible, brave and risky, fun and full of enthusiasm. Less prone to forms of anxiety, unstable emotions, practical, independent and realistic, self-confident and resistant. Young basketball players also have similar factors: achievement orientation, self-confidence and factors whose existence can be explained by the psychological features of that age, emotional reactions (younger basketball players express their emotions more clearly), orientation towards competition, sensuality, autonomy (young people are more confident in their own efforts) are open to change (young people are more tolerant of new, non-traditional things and relationships) (Jakovljević et al., 2010). The influence of such results may not only be the skills of basketball players, but also the psychological readiness. References: Fronso, S., Nakamura, F.Y., Bortoli, L., et al. (2013). Stress and Recovery Balance in Amateur Basketball Players: Differences by Gender and Preparation Phase. International Journal of Sports Physiology and Performance, 8,618–622. Jakovljević, S., Karalejić, M., Lazarević, L. (2010). The latent structure of conative dimensions of elite senior and junior basketball players. Physical Education and Sport, 8,21–30. Neil, R., Hanton, S., Mellalieu, S.D., Fletcher, D. (2011). Competition stress and emotions in sport performers: The role of further appraisals. Psychology of Sport and Exercise, 12(4),460–470.

TURNOVERS ON OFFENSE IN LITHUANIAN WOMEN'S BASKETBALL.

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Introduction: During acceleration in an active attack and defenses, basketball players make more mistakes. The minimizing of turnovers should be the main concern of the offense to achieve a victory. Fylaktakidou et al. (2011) has explored the most common mistakes that occur in game court, distinguishing five areas: the distance from the basket where the turnover was made, restricted area, perimeter, three-point area, mid-court, backcourt. It was interesting to investigate what kind of turnovers and the place is performed during the match, as well as during the various quarters. Hypothesis - the most basketball players will be passing mistakes, often make mistakes in the fourth quarter (because of fatigue), and their location will be under the basket area. Methods: The women's basketball teams participating in the first division were examined (n = 8). A match analysis was performed, n = 98. In specific protocols have been recorded the main turnovers by quarters. An analysis of types of turnovers: passing turnovers, traveling, ball handling errors, ball returned to the backcourt (three, five, eight, twenty-four) seconds rule, double dribbling, and offensive foul. The statistical analyses were performed using SPSS statistics V21.0. Results: Analysis of the women's team's offensive nature of the mistakes. We found that the teams have passing turnovers (49.6%), ball control (23.4%), dribbling (19.8%) and other mistakes (7.2%). Players made mistakes: under the basket area (44.2%), three-point area (22.9%) and restricted area (14.3%), the middle area (10.7%), the sideline (7.9%). Most turnovers were made in the fourth quarter (28.3% of all mistakes made), but less in the first quarter (22.6%). Most were passing mistakes in which the team has an average of 7.0 ± 1.0 times per game. Discussion: The hypothesis was confirmed that players usually does mistakes during passing the ball to the partner, and the most common is repeated in the fourth quarter. The bigger amount of mistakes players make in the area under the basket. According to Karipidis et al. (2001) the main offensive goal for the team is to make less than ten turnovers per game. Of course, it would be relevant for this research to determine which position players are most likely to be mistaken and which turnovers are most common to individual players. In the future, the coaches should spend more time practicing passing skills and ball handling, if they want to reduce their team's turnover percentages and improve significantly their offensive performance, as reducing the turnovers means increasing the chances of effective ball possession. References: Fylaktakidou, A., Tsamourtzis, E., Zaggelidis, G. (2011). The turnovers analysis to the women's national league basketball games. Sport Science Review, vol. XX, No. 3-4. Karipidis, A., Fotinakis, P., Taxildaris, K., Fatouros, J. (2001). Factors characterizing a successful performance in basketball. Journal of Human Movement Studies, 41, 385-397.

LEARNING AS TRANSFORMATION: LAYING THE FOUNDATIONS OF EXPERTISE BY ELITE LEVEL INDIGENOUS AUSTRALIAN SPORTSMEN.

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Introduction: Australian Indigenous athletes are renowned and celebrated for their magic skills, understanding, anticipation, ability to read the game and flair in the AFL (Australian Football League) and the NRL (National Rugby League). This is typically attributed to racially inherited genetics but recently this simplistic explanation has been challenged yet there has been limited research conducted

in this area. This presentation draws on a three-year study that takes this challenge forward by inquiring into the development of expertise by elite level Indigenous Australian athletes in the AFL and NRL as a process of life long, situated learning. Methods: Conducted over three years by one Indigenous and one non Indigenous researcher this study employed a methodology that combined constructivist grounded theory with narrative inquiry methodology, and informed by the Indigenous methodology of dadirri it focused on the life stories of eight AFL and eight NRL players and the socio-cultural factors that facilitated their development of expertise as a process of situated learning from their first touch of the 'footy' to reaching the elite professional level of their sport. Results and discussion: The study identified the main stages of development as being (1) Laying the foundations of expertise as children up to the age of around 12-13 years and (2) Cultural transitioning from Indigenous ways of learning, training and playing to the demands of professional sport shaped by a global culture of sport as business. This presentation focuses on the first theme to identify the importance of the social and cultural environment for the participants' development of expertise. In particular it suggests the pivotal role that informal, 'knock up' games, shaped by Aboriginal culture, played in their development of game sense, creativity and anticipation as hallmarks of Indigenous AFL and NRL players. References: None.

Economics

SPORT FINANCING THROUGH THE GAMBLING REVENUES IN MONTENEGRO.

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Introduction: Sport financing is of great national importance, having in mind that it's recognized as an activity of public interest by the Law. Since most of sport organizations in Montenegro are publicly owned, they are dependent on public financing – from the local and state budgets which are often insufficient. Therefore, new sources of financing must be introduced. One of the most common funding systems in Europe includes resources redirected from gambling industry profits – taxed by the government. This paper analyzes current Montenegrin system of sport financing from this source, compares it to other European countries and provides recommendations for its' improvement. Taking into account that most gambling revenues come from sport betting, it would be beneficial for the society that most of these incomes find their way back to sport. Methods: Methods used in this paper are content analysis, and comparative case study method. The comparative method provides the review of similarities and differences of certain countries' systems, making it possible to derive relevant conclusions about the improvement of the existing system of sport financing in Montenegro. On the other hand, content analysis method determines the current level of investment in sports from the income from games of chance, thus enabling the ranking of sports in relation to the funds received, as well as the recognition of priority areas in sports. Results: The research results for Montenegro show considerable lagging behind other European countries in terms of sport funding from taxed gambling profits. With the share of only 14% of funds allocated to sport from this source there is a plenty of room for Montenegro to improve its' sport financing system, which would lead to faster sport development. This share is considerably low, compared to neighboring EU countries such as Croatia's 35% and Slovenia's 80%. Discussion: Even though the certain amount of gambling profits is given back to sport, and, in a broader sense, to society in general, there are ways to improve this system, having in mind the total amount of the revenue generated through gambling taxes – EUR 10.85 million in 2016. Also, stated figure is only just a part of the actual gambling revenue,

since there is no efficient control mechanisms and the Government mostly relies on the reports provided by the gambling companies. However, during 2017, the Ministry of Finance started implementing the ISONIS, expecting to improve the tax collection in this industry. With these improvements and taking into account other countries good practice examples, Montenegrin sport financing system can be considerably improved. References: Institut za javne finansije. (2012). Financiranje sporta u republici hrvatskoj s usporednim prikazom financiranja u europskoj uniji. Novembar 2012, Zagreb. Radošević, I., Ostojić, B. and Gavrilović, A. (2016). Izvori finansiranja u sportskoj industriji. Vojno delo, Vol 3, 255-264.

Health and Fitness

SCHOOL TYPE DIFFERENCES IN PHYSICAL AND SEDENTARY BEHAVIORS AMONG CROATIAN ADOLESCENTS.

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Introduction: Physical activity level in children and adolescents varies to a great extent and is affected by numerous factors. The aim of the study was to analyse physical activity (PA) level, active energy expenditure in physical activity (PAEE) and time spend sedentary in adolescents with regard to school type they are attending. Methods: The sample consisted of 844 students (434 boys and 410 girls) aged 15, enrolled in academic and vocational school programs. PA and AEE were assessed during four days using a multiple-sensor body monitor (SenseWear Armband; BodyMedia Inc.). Data concerning screen time (SCT) were collected through a standardized questionnaire. Differences in PAEE, PA duration and SCT between adolescents from different schools types were tested using analysis of variance (ANOVA). Logistic regression analysis was used to assess the relations between PA and sedentary behaviours and weight status. 12% of girls enrolled in academic and 16% of girls enrolled in vocational schools ($p=0.42$) and 10% of boys enrolled in academic and 20% of boys enrolled in vocational school ($p=0.02$) were overweight. The results did not reveal significant difference in AEE, and time spent in moderate, moderate to vigorous as well as in vigorous PA between students enrolled in different study programs. However, total sedentary time during the school week and SCT were significantly longer in girls enrolled in vocational programs ($p=0.02$). Boys enrolled in vocational school also spend significantly more time at front of TV and PC screen during school week than boys attending academic school, but during weekends differences were not significant. Adolescents of both sexes enrolled in academic programs spend significantly more time doing homework. Logistic regression analysis showed a significant decrease of risk being overweight in male adolescents in the highest quartile of MVPA (OR 0.48) and in those who spend the least time doing homework. In girls no significant relationships between PA and sedentary behaviour and weight status were found. Conclusions: The study indicates differences in weight status and sedentary behaviour between students in vocational and academic school programs. Adolescents enrolled in vocational schools should be a major target group for preventive measures to modify sedentary behaviour. This study was funded by the Croatian Science Foundation under the number 9926 (Internet page: http://www.hrzz.hr/default.aspx?id=78&pid=9926&rok=2016-06). References: Haug S, Schaub MP, Salis Gross C, JohnU, Meyer C. Predictors of hazardous drinking, tobacco smoking and physical inactivity in vocational school students. Public Health 2013; 13:475-84. van der Horst K, Oenema A, te Velde SJ, Brug J. Gender, ethnic and school type differences in overweight and energy balance-related behaviours among Dutch adolescents. Int J Pediatr Obes. 2009;4(4):371-80.

FROM SPORT PERFORMANCE TO HEALTH PERFORMANCE. THE HEALTH-BASED MODEL OF PHYSICAL ACTIVITY IN FRANCE.

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Introduction: Since the 1980's, Alain Loret qualified the evolution of sport and physical activity in France as evolving from a model based on performance, with all aspects constantly measured and numbered ("digital sport"), to a model based on leisure and non-institutionalized sport ("analog sport"). From a highly institutionalized sector monopolized by the State and sports federations, he noted the significant development, in parallel, of less constraining activities outside of performance-based sports institutions. Today one could argue that a new sports model is taking an increasingly clear shape in France, that of medicalized sport. The "sport for health" sector is blooming in France, reinforced by a recent legal amendment of the public health code (L. 1142 30 of 27 March 2015) encouraging medical prescription of physical activity for chronic illness. This paper addresses how the activities born of this new fusion between the sports and medical sectors have tended to evolve around a biomedical model of health, on the one hand, and a sports culture based on measurements and performance, on the other. Methods: The results stem from participant observations and interviews in three different regional and illness-related contexts of adapted physical activity (APA) in France that have developed in conjugation with the medical sector. This was complemented by observations and interviews with members of an association in one of the regions, in charge of, as delegated by the Regional Agency of Health (ARS), coordinating and labeling the APA offers in one part of the region. Interviews pertained to the objectives, organization and criteria of the physical activity sessions. Results: Results suggest that the combination of digital sports culture and the biomedical model of health, along with the necessity of "performance indicators" as requested by financing agencies, have created a medicalized sport model. Measurements of health and sport performance accompany the participants from the beginning to the end of their program, motivating and evaluating participants as per to their "progress" in terms both physical capacity and physical health. References: Bezes P., Chiapello E., Desmarez P. (2016). Introduction: la tension savoirs-pouvoirs à l'épreuve du gouvernement par les indicateurs de performance, Sociologie du travail, 58, pp. 347–369. Hénaff-Pineau P.-C. (2014). Le médecin généraliste, promoteur d'activités physiques et sportives pour les personnes âgées?, Retraite et société, 67, pp. 131-155. Loret A. (1995). Génération glisse, Broché, Paris.

Motor Learning

GENDER SPECIFIC INFLUENCE OF FUNDAMENTAL MOVEMENT SKILLS ON GYMNASTICS PERFORMANCE OF CHILDREN.

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Introduction: The aim of this study was to determine gender specific influence of fundamental movement skills on gymnastics performance among prepubescent children. Methods: Total of 70 children of which 35 boys and 35 girls, from 6.5 to 7.5 years participated in study. After being tested in Fundamental movement skills (FMS), all subjects during classes of physical education performed identical gymnastic

training for 4 moths twice weekly and then they were assessed in gymnastic performance. FMS were tested by means of complex polygons that covered 4 different FMS areas according Zuvela, Bozanic & Miletic (2011). Gymnastic training comprised of acquiring and refinement of the basic gymnastic skills while measure of gymnastics performance was formed as a sum of scores on 12 gymnastic elements (bridge, forward roll, blade stand, descended backward roll, handstand against wall, dominant frontal cartwheel, ring swinging with backswing mount, straight jump of springboard, springboard jump on the vault in sitting position, switching positions on the rings, walking on a small beam, jump-off of small beam). Regression analysis was applied to assess influence of FMS predictors on gymnastic performance criterion for each subsample. Results: Multiple regression analyses showed no influence of FMS predictors on criterion variable of gymnastics performance among boys (p=0,06; R=0,55). Contrary, among subsample of girls, significant influence of predictor set on criterion was observed (p=0,00; R=0,75). Discussion: Despite prepubescent children of different sex are very often percepted as unique cohort regarding diverse motor functioning (Babin, Bavcevic & Prskalo 2010; MZOS, 2006), results of our study suggested otherwise. Namely, we observed gender specific influence of FMS on gymnastics performance with significant influence only among girls subsample. Contrary to girls, diverse motor manifestations of boys seems to be lesser of universal qualities. Fact that FMS polygons applied in our study comprised from tasks (running, throwing ball, sprinting, jumping) whose movement patterns differentiate significantly to those that formed score in gymnastics performance, most likely explained result among boys. References: Babin, J., Bavcevic, T. & Prskalo, I. (2010). Comparative analysis of the specially programmed kinesiological activity on motor area structural changes of male pupils aged 6 to 8. Croatian Journal of Education, 12(1), 79-96. Ministarstvo znanosti, obrazovanja i sporta, Republika Hrvatska (2006). Nastavni plan i program za osnovnu skolu. Narodne novine. Zagreb: MZOS. Zuvela, F., Bozanic, A., & Miletic, Đ. (2011). POLYGON – A new fundamental movement skills test for 8 year old children: construction and validation. Journal of Sports Science and medicine, 10.

THE COMPARISON OF LATERALIZATION IN FUNDAMENTAL SOCCER SKILLS BETWEEN THE RIGHT- AND LEFT-FOOTED SOCCER PLAYERS.

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Introduction: In many sports, it is very essential to use the both sides of the body to get a tactical of the game (Akpinar & Bicer, 2014). Moreover, it is also one of the important aspects to be a professional player (Loffing et al., 2010). Thus, it is critical to test the lateralization of the players in different sports. The aim of the study was to make comparison in lateralization between the right- and left-footed soccer players in some fundamental soccer skills. Methods: For this purpose, the total number of 29 soccer players between the ages of 9-11 years old voluntarily participated to this study. 11 players were left-footed and 18 of them were right-footed. The lateral preference inventory was used to find the dominant foot. All the players had at least 1 year of experience and they were all actively a part of a soccer team. In order to test the fundamental soccer skills; dribbling, juggling, passing, and shooting tests were applied (Haaland & Hoff, 2003; Hoare & Hoff, 2003; McGregor et al., 1999). For the statistical analysis, Mann Whitney U test was used in SPSS software. Results: The results of the statistical analyses displayed that left-footed players performed better with their dominant foot on the passing and shooting tests compared to dominant foot of the right-footed players. Moreover, left-footed players had better performance with their non-dominant foot on the dribbling test compared to non-dominant foot of the right-footed players.

Discussion: In some sports, tennis and cricket, left-handed players had advantage and better performance comparing with right-handed players (Loffing et al., 2010). In this study with 9-11 years old soccer players, left-footed players' superior performance for some skills both with their dominant and non-dominant foot comparing with the dominant and non-dominant foot of the right-footed players. In this respect, it may be advisable to direct left-footed children to the soccer. It is also important for the trainers to arrange the drills at the training including the usage of the both foot. In the future studies, it would be also beneficial to investigate if the left-footed players have an innate advantage compared to right-footed players in terms of some coordination patterns. References: Akpinar S, Bicer B (2014). Why Left-handers/footers are overrepresented in some sports? Monten. J. Sports Sci. Med. McGregor SJ, Nicholas CW, Lakomy HKA, Williams C.(1999) The influence of intermittent high-intensity shuttle running and fluid ingestion on the performance of a soccer skill. J Sports Sci. Haaland E, Hoff J (2003). Non-dominant leg training improves the bilateral motor performance of soccer players. Scand JMed Sci Sports. Hoare DG, Warr CR (2000). Talent identification and women's soccer: an Australian experience. J Sports Sci. Loffing F, Hagemann N, & Strauss B (2010). Automated processes in tennis: Do left-handed players benefit from the tactical preferences of their opponents? J of S Sci

PLAYING PIANO CAN MODIFY THE HAND PREFERENCE.

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Introduction: Handedness is defined as the preference to use one hand as oppose to other for some tasks (Oldfield, 1971). Some researchers use questionnaires to measure the handedness (Mikheev et al. 2002), but others stated that it is a motor asymmetry observed in the performance (Akpinar et al., 2015). It has been also stated that practice sports for a long time can modify the hand preference (Akpinar, 2015). In this study, we have tested if we can observe the same behavior in a different area, playing piano. Thus, the aim was to test if playing piano can modify the hand preference. Methods: For this purpose, 51 piano players and 51 non-piano players were asked to reach one of 23 targets in a virtual reality environment. All the participants were right-handed. Participants made 5 reaches to each target. Reaching frequency, which quantifies the hand preference, was calculated for each hand and each group. To analyze if the hand preference pattern is different between two groups, we calculated the total reaching frequency for the non-dominant hand for each group and conducted t-test. Results: The result of the statistical analysis displayed that the frequency of usage of the non-dominant hand for the piano players (40%) was significantly more compared to the same hand of non-players (31%). That is, piano players preferred to use their left non-dominant hand more in comparison to non-players. Discussion: In the previous studies, it has been stated that long-terms unimanual (Akpinar et al., 2015) or bimanual training (Akpinar, 2015) with some sports can change the hand preference. In this current study, it has been shown that practicing piano at least 3 years can also modify the hand preference. Therefore, not only practicing sports but also practicing musical instrument has an effect on hand preference. Even though we do not know if the piano players less lateralized in handedness or playing piano affected their hand preference, but we can suggest that people with less lateralized in handedness may directed to practice piano. References: None.

PIANO PLAYERS LESS LATERALIZED COMPARED TO NON-PIANO PLAYERS.

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Introduction: Lateralization was defined as the tendency for some neural or cognitive functions to be more dominant in one hemisphere than the other (Brodal, 2016). Many studies have shown that physical exercise and sport specific trainings can attenuate lateralization (Akpinar, 2015; 2016; Akpinar et al., 2015). In this current study, we have investigated if we can observe the similar trend in a different practice, playing piano. Thus, the aim was to measure if playing piano decrease the lateralization in reaching performance. Methods: For this purpose, 51 piano players and 51 non-piano players were asked to reach one of 23 targets in a virtual reality environment. All the participants were right-handed. Participants made 5 reaches to each target. Movement accuracy (final position error, FPE) and movement quality (hand path deviation from linearity, HPDL), which quantifies the motor performance of the arm movements, were calculated for each arm and each group. To analyze if the the lateralization in arm performance is different between two groups and within arms, we conducted a 2-way Mixed model ANOVA and set the statistical level as $p<.05$. Results: The results of the statistical analyses for both FPE and HPDL were similar. In short, piano players displayed better performance with their both non-dominant and dominant arms in comparison to the same arms of the non-piano players. Moreover, Whereas there was not significant difference between the non-dominant and dominant arm of piano players for both measurements, dominant arm of non-piano players displayed significantly better accuracy and linearity compared to non-dominant arm of the same group. Discussion: In the previous studies, it has been stated that long-terms unimanual (Akpinar et al., 2015), bimanual training (Akpinar, 2015), and playing musical instrument (Kaya, 2015) decreased the lateralization in arms. In this current study, it has been shown that practicing piano at least 3 years can also modify the lateralization. Therefore, not only practicing sports but also practicing musical instrument has an effect on lateralization. Even though we do not know if the piano players less lateralized in reaching performance or playing piano affected their performance, but we can suggest that people with less lateralized may directed to practice piano. References: Akpinar S, (2015). The effect of long-term bimanual training on arm selection during reaching tasks. Kinesiology. Akpinar, S., Sainburg, R.L., Kirazci, S., & Przybyla, A. (2015). Motor asymmetry in elite fencers. Journal of Motor Behavior, 47(4), 302-311. Brodal P, (2016). The central nervous system. Oxford University Press. Kaya EE (2015). The Effect Of Playing Different Musical Instruments On Arm Asymmetry. Educatıonal Research And Revıews.

NON-PHYSICAL TECHNIQUES TO COUNTERACT AGE- AND IMMOBILIZATION-RELATED FUNCTIONAL DECLINE.

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Introduction: Prolonged physical inactivity or immobilization, as well as normal and pathological aging process are associated with several functional impairments that can reduce quality of life and represent a general challenge for public healthcare systems (Pisot et al., 2016; Kortebein et al., 2008). Currently an early start of (physical) rehabilitation is suggested to counteract negative adaptations, with a parallel

development of non-physical approaches. Such are cognitive training that targets mostly memory and attention (Marusic et al., 2016) or motor imagery, which represents the mental simulation of an action, without any corresponding motor output (Grospretre et al., 2016). Both are suggested to be used alone or in a combination with physical exercises. The aim of this study was to provide evidence how both non-physical techniques can add an additional value to the traditional physical exercise therapy. Methods: Cognitive and motor outcomes were evaluated in a randomized controlled trial with i) 20 patients (mean age=64y); pre- and 2-month post-hip replacement surgery and motor imagery (MI) training, and ii) 20 healthy older adults (mean age=65y); pre- and 2-month post- computerized cognitive training intervention (CCT). Interactions were tested by a 2-way analysis of variance (ANOVA) at the p level < 0.05. Results: All participants had the Montreal Cognitive Assessment score higher than 26 points. Furthermore, significant interactions were found for fast paced walking condition, where better cognitive-motor outcomes were present in patients after 2-month of MI (p=0.022) as well as healthy older adults after 2-month of CCT (p=0.040). Discussion: Our results suggest that non-physical interventions (MI and/or CCT protocols) are effective to improve motor-cognitive performance after period of immobilization/limited physical activity as well as after normal aging process. The use of non-physical techniques is highly recommended when physical practice is limited or even not possible. Future research should evaluate the combined effect of physical and non-physical approaches and further reveal a proper dose-response relationship. References: Grosprêtre S (2016). European journal of sport science, 16(3), 317-324. Kortebein P et al. (2008). The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 63(10), 1076-1081. Marusic U (2016). Aging, Neuropsychology, and Cognition, 25(1), 49-69. Pisot R et al. (2016). Journal of Applied Physiology, 120(8), 922-929.

PRESCHOOL CHILDREN'S RESULTS IN MOVEMENT ABC TESTS: DIFFERENCES BETWEEN GIRLS AND BOYS IN MOVEMENT DEFICIT.

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Introduction: The aim of our study was to assess the children's motor skills on a sample of preschool children between the age of 4 and 5 ($\bar{x}$ = 4.44, SO = 0.46), using a checklist questionnaire and movement assessment battery for children. We wanted to know whether the examined sample shows any deficits in movement or any physical difficulties, as well as what are the differences in gender. The study included 100 children, 47 (47%) boys and 53 (53%) girls, from three kindergartens on the Slovenian coastal region. We used the percentile norms for common evaluation of movement problems. The total score below 15 percentile which indicates movement problems, was determined in 27 % of children, of which 66.7% in girls and 33.3% in boys. Statistically significant gender difference was found in the skipping rope test (p = 0.005), where boys performed better ($\bar{x}$ = 0.21) than girls ($\bar{x}$ = 1.08). The findings show a high incidence of movement difficulties in preschool children, as a quarter of children do not reach the expected level of motor development, thus, this indicates the suspected occurrence of developmental coordination disorder. Further research is needed in the field of movement ABC tests application and in the incidence of movement deficits on a representative sample. It is also advisable to identify the factors that are associated with movement deviations in preschool children. In encouraging, a child's motor development a greater attention should be given to girls in particular. The results of the movement ABC tests need to be considered from the perspective of the child's holistic development and their motivation to perform. Discussion: Our study showed that a quarter of children aged 4 to 5 years, does

not reach the expected level of motor skills and suspected occurrence of developmental coordination disorder (DCD) is thus indicated. In completing and generalizing the results obtained, it is necessary to take into account also certain limitations of our study, such as a deliberately selected sample of children from three kindergartens on the Slovenian coastal region, the age of the children in the study (4-5 year olds) and the sample size. It is recommended to be cautious in establishing the findings regarding the child's status on the basis of the test achievements in order to avoid technical errors and negative effects on the child's development. References: Henderson, S. E., & Sugden, D. A. (1992). Baterija za oceno otrokovega gibanja. Priročnik. ABC gibanja [Movement assessment battery for children]. Ljubljana: Center za psihodiagnostična sredstva.

Neuromuscular Physiology

ACUTE EFFECTS OF STATIC STRETCHING DURING WARM-UP.

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Introduction: Static stretching (SS) is routinely practiced during warm-up although several negative effects on performance have been shown (for review see Simic et al 2013). The aim of this study was to find out, when negative effects of SS appear, how long they last and whether it is possible to reduce the negative effects of SS with activation exercises. Methods: Nineteen 14-year old healthy male soccer players participated in the study. Cross-over study design was used. In the experimental condition, all the subjects performed a general warm-up, followed by 7 sets of 20-s SS for hamstrings, knee extensors, hip adductors and plantar flexors. After the last set of SS a set of activation exercises followed. In the control condition, subjects went through similar procedure, but without activation exercises after the last set of SS. Acute effects of SS on flexibility, countermovement jump height (JH), peak power during countermovement jump (PPJ) and isometric strength were measured. Results: Warm-up had a positive effect on JH ($p = 0.016$, Eta2 = 0.364), PPJ ($p = 0.001$, Eta2 = 0.300) and hip adductor flexibility ($p = 0.008$, Eta2 = 0.187). SS had statistically significant negative effect on JH ($p = 0.016$, Eta2 = ñ0.193) and PPJ ($p = 0.001$, Eta2 = -0.412) and positive effect on hamstrings ($p = 0.021$, Eta2 = 0.319) and hip adductors flexibility ($p = 0.003$, Eta2 = 0.193), while no effect on strength was shown ($p > 0.05$). Muscle power decreased after the first set of SS (-7 %). The peak negative effect on muscle power appeared after the fifth set of SS (-11 %). Significant effects were present more than 15 min after the last SS set ($p < 0.05$). Activation exercises did not have impact on muscle performance ($p > 0.05$). Discussion: Results of this applicative study have shown that active warm-up improves muscle performance and flexibility in young soccer players which can reduce injury risk (for review see Behm et al., 2016, Lewis 2014). On the contrary, SS can have negative impact on muscle power already after 20 s of SS which supports conclusions of previous review study (Simic et al., 2013). When stretching is repeated the effects can last more than 15 min. Furthermore, these negative effects are not neutralized by post stretching activation exercises. A possible solution could be avoidance of SS in warm-up when the aim of the training or match is explosive task performance. In future research follow up longer than 15 min would be warranted. References: Simic, L., Sarabon, N., Markovic, G. (2013). Scand J Med Sci Sports, 23, 131-148. Behm, D. G., Blazevich, A. J., t, A. D. in McHugh, M. (2016). Appl Physiol Nutr Metab, 41, 1-11. Lewis, J. (2014). Orthopaedic Nursing, 33(6), 312-320.

MUSCLE INHIBITION FOLLOWING TOTAL KNEE ARTHROPLASTY SURGERY: INSIGHTS FROM TENSIOMYOGRAPHY.

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Introduction: Total knee arthroplasty (TKA) represents one of the most frequent orthopedic surgeries among older adults that leads to considerable decline in knee function. Thus, long-lasting inability to fully activate the quadriceps muscle, a process known as arthrogenic muscle inhibition (AMI) is common phenomenon that occurs following TKA (Hurley et al., 1994). AMI is caused by a change in the discharge of articular sensory receptors due to factors such as swelling, inflammation, joint laxity, and damage to joint afferents (Rice & McNair, 2010). However, the response of individual quadriceps muscles in relation to this phenomenon is still unclear. Methods: Using non-invasive tensiomyography we assessed the maximal amplitude of radial displacement (Dm) in ten TKA patients (mean (SD) age 58,3 (6,0) years, height 173,2 (8,5) cm, mass 93,4 (12,9) kg. TMG was measured bilaterally before and one month after surgery in three leg skeletal muscles: vastus lateralis (VL), vastus medialis (VM), and gastrocnemius medialis (GM). Results: One month after surgery, VM of operated leg experienced Dm decrease of 37,3 % ($p = 0.002$), while other muscles were not significantly altered. Discussion: Our data suggest that tensiomyography is clinically valuable tool to assess muscle inhibition following TKA. While, AMI affects knee function and therefore a human locomotion in general, AMI seems to be a muscle specific. References: Hurley MV, Jones DW, Newham DJ (1994). Clin Sci, 86(3):305-10. Rice DA, McNair PJ (2010). Semin Arthritis Rheum, 40(3):250-66.

Other

ENSURING PREVENTION AND SAFETY IN THE SELECTED WATERPARK.

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Introduction: The purpose of this study was to compare Czech Republic educational program in the field of water rescue with United States system. The second purpose was to acquaint and analyze the system of prevention and safety in the selected waterpark in the United States and build a model “Plan for normal operation” and “Plan of danger” selected waterpark. Methodology: The work is based from available material of non-experimental character. This is a descriptive work that all acquired, collected and subsequently interprets structured information in the form of a draft in relation to the issue of prevention and safety on the selected device. Results: Summary description of the system to ensure prevention and safety in swimming pools, and water parks in the USA showed that their system is more sophisticated and consistent than a similar system in the Czech Republic, huge differences between each other. The lifeguards attitudes in USA by Ellis & Association were significantly more properly and decently. Discussion: In USA the organization of water safety Ellis & Association believe their findings of innovation is exact with the results of the number rescued people in water park. Development and maintenance of rescue expertise is irreplaceable by Ellis & Association. This study revealed many shortcomings of prevention and water safety in Czech Republic. However sample plans were a demonstration of a thorough system that can serve as a model for innovation in the system of security prevention and safety. References:

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Physical Education and Pedagogics

LINK BETWEEN PERSONAL CHARACTERISTICS AND BULLYING AMONG ATHLETES AND NON-ATHLETES ADOLESCENTS.

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Introduction: When determining the influence on behavioral problems of children, researchers have found that the temperament of its biological basis reflects the sequence of behavior and personality and emotion predicts, among other factors, the performance behavior of a personality, psychopathology and personality traits forecasts. Also, a correlation was found between temperament and character of the child's perception of health, motivation, skills and social functioning - children who have strong personality, characterized by an increased resistance to psychological and social difficulties (Hutchinson et al., 2010). Research objectives – to determine the relations of experience bullying athletes and non-athletes adolescents with their personal characteristics - extroversion, introversion, neuroticism. Methodology: The study involved of 802 adolescents of Lithuania, aged 12-17 years in 2016. G. Eysenck Personality Inventory was used. Also respondents received the Bullying Questionnaire (based on the Bullying Questionnaire of the British city of York), which was adapted in Lithuania. Results: In general adolescents describing their experiences of bullying noted that they sometimes bullied others, and also sometimes were exposed to bullying, but significant differences in these indicators between athletes and non-athletes were not revealed. Significant differences were observed between young non-athletes' and athletes' personal features: the introversion and neuroticism significantly prevailed among athletes adolescents. Discussion: McKnight et al. (2002) found that the dominant one or the other characteristics of the individual determines the individual's behavior and its interaction with the social environment. For example, extraversion positively related to human well-being, dominance, sociability, the performance of duties, heroism. However, the results of our study revealed that adolescent's extraversion positively connected with the initiation of bullying. Thus, we can expect that extroversion is one of the factors contributing to the initiation of bullying among adolescents, as extroverts use different higher level of activity that often causes them to act recklessly, ignoring the potential serious consequences or the threat of punishment. This data proves to be true G. Bjornebekk (in Ahmad, 2010), which found a positive correlation between behavioral activation system, suspicion, and emotional aggression. References: Ahmad I. (2010). The Big Five Personality Inventory: Performance of Students and Community in Pakistan. J. of Behavioral Sciences, 20 (2), 63–79. Hutchinson A. M. K., Stuart A. D., Pretorius H.G. (2010). Biological contributions to well–being: The relationships among temperament, character strengths and resilience. J. of Industrial Psychology, 36 (2), 1–10. McKnight C.G., Huebner E.S., Suldo S. (2002). Relationships among stressful life events, temperament, problem behavior and global life satisfaction in adolescents. Psychology in the schools, 39 (6), 677–687.

INVESTIGATION OF THE EFFECT OF MUSIC ON HIGH SCHOOL STUDENTS ATTITUDES TOWARDS PHYSICAL EDUCATION AND SPORTS COURSE OF AND CREATIVITY.

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Introduction: Music is a commonly used concept in the society and has an effect on human behavior. Music causes different behaviors to occur when used both during training and exercise. The aim of this study is to Investigation of the Effect of Music on High School Students Attitudes towards Physical Education and Sports Course of and Creativity. Methods: The research group was made of 9th, 10th, 11th, 12th 85 male 66 female, 151 (age= 15.4040 + 1.14995) in total studying high school located in the Karaman province to achieve the purpose of the research, "Adaptation-Innovation Inventory (KAI)" Originally Developed By Krikton., (1999) and attitudes towards physical education and sports course scale By Demirhan and Altay (2001) were based on and applied to the students that participated in the research. 12 weeks of instruction in physical education and sports courses including of music and In the study, an experimental research design with pre-test/post-test and control group was used. In the analysis and assessment of the data, Shapiror Wilk Test, Paired Samples T-Test, and Pearson correlation test, Two-Way Anova for Mixed Measures Test was used and significance was taken as $P<0.05$. Results: As a result of this study; it has been revealed that the students who are educated with music applied to high school students have positively influenced their attitudes and creativity levels regarding physical education and sports lesson. Within this study; there was a significant difference between the pre-test and post-test results of the experimental and control groups; and there was significant difference between post-test results of the experimental and control groups. Discussion: These findings show us that the natural movement reaction that causes physiological effects when music is played out, and that the use of music in physical education classes affects the learning and teaching environment positively. Furthermore, the results also show us that music is an important concept in the internalization of motor skills and talents in the development of individuals depending on cognitive development. References: Demirhan, G. & Altay, F. (2001). Attitude Scale Of High School First Graders Towards Physical Education and sport II, Hacettepe Journal of Sports Sciences 2001, 12 (2), 9-20. Kirton MJ. (1999). Kirton Adaption-Innovation Inventory manual (3rd ed.). Berkhamsted, UK: Occupational Research Center.

FACTORS INFLUENCING PARTICIPATION IN SCHOOL BASED PHYSICAL ACTIVITY PROGRAMS AMONG ADOLESCENTS.

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Introduction: Physical inactivity is a major challenge for public health in today's world of rapid changes. Schools are supposed to be an important setting for youngsters to get involved in, and through school-based Physical Education activities, students should learn and develop competencies and confidence about physical activity and promotion of active lifestyle living. Negative stereotyping and public perception have also influenced how society views physical education (Harris, 2003). The main goal of

this study was to explore factors influencing motivation during school based Physical Activity programs (before, during, and after-school physical activity) among adolescents. Methods: This research used a qualitative approach to identify concerns, causes and possible teacher-proposed interventions to address the challenge of adolescents' motivation for school-based physical activity programs participation. The participants of this study were seven PE Teachers (males=5; females=2) from seven upper secondary public schools, with 3 to 31 years of physical education teaching experience. This research used a qualitative approach to identify school-based Physical Activity programs, challenges facing students and PE teachers to implement these programs and possible teacher-proposed interventions to address the quality PA programs in terms of increasing adolescent's participation in school-based PA qualitative programs. Semi-structured interviews, observations were the methods used to collect data. Results: Results indicated that factors which influenced adolescents participation in school –based PA programs were (a) Lack of updated Professional development programs for PE Teachers, (b) lack of extracurricular Sport and Physical Activity programs, (c) lack of Extra-School Sport and Physical Activity, (d) Sedentary behavior among adolescents. Discussion: This study supports literature that says schools are useful settings for supporting the development of good lifestyle practices. (St Leger L, 2004).Intrinsic motivation (IM) has been one of the concepts studied in motivational research in physical education. According to Deci and Ryan (1985), intrinsically motivated behaviors are engaged in for their own sake, for the pleasure and satisfaction derived from the process of engaging in the activity. Intrinsically motivated behaviors are associated with psychological well-being, interest, enjoyment, fun, and persistence (Ryan & Deci, 2000). Intensifying efforts to promote healthy physical activity is consistent with the mission of schools—educating young people to become healthy, productive citizens who can make meaningful contributions to society. References: Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. New York: Plenum. Duda, J. L., Chi, L., Newton, M. L., Walling, M. D., & Catley, D. (1995). Task and ego orientation and intrinsic motivation in sport. International Journal of Sport Psychology, 26 ,40 – 63.

EFFECT OF TEN-WEEK MEDICINE BALL INTERVENTION PROGRAM IN ELEMENTARY SCHOOL CHILDREN.

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Introduction: Physical activity can prevent many health problems in adulthood, bring many physiological and psychosocial benefits in childhood, and improve the quality of life. Therefore, physical education, as a main source of physical activity in adolescence, should provide a variety of age appropriate physical activities in order to meet diverse students' needs. The medicine ball training program has been used by many PE teachers and is thought to have many positive effects on physical fitness of children (Faigenbaum & Mediate, 2016). The aim of this study was to analyze effects of ten-week medicine ball intervention program in elementary school children. Methods: The sample included 54 students of the elementary school, 11-12-years of age, who voluntarily participated in the study. Participants were assigned into intervention (n = 26) and control group (n = 28). Physical fitness of children was estimated by the following tests: 20m dash, Sit-ups, Bent-arm hang, Pushups, Standing broad jump and Medicine ball test. The intervention group had regular physical education classes twice a week, with a 20-minute set of medicine ball exercises included. Medicine ball exercises engaged lower body (e.g., underhand squat, over and behind head throw), upper body (e.g., shoulder press, medicine ball slams and throws),

stability (e.g., single leg toss) and reaction time exercises (e.g., wall chest pass). The intervention lasted 10 weeks. The rest of each PE class was delivered in accordance to standard curriculum. The control group participated only in regular PE class twice per week. A two-way repeated measure ANOVA (2 × 2) was used to test for interactions and main effects for time (initial vs. final) and group (intervention vs. control) on the dependent physical fitness variables. Results: There was a significant main effect for treatment, $F=24.4$, $p<0.001$, and a significant interaction, $F= 3.5$, $p<0.04$.The intervention group made significant improvements in the Sit-ups, Bent-arm hangs, Pushups, Standing broad jump and Medicine ball test. Discussion: The results indicate significant gains in muscular fitness only in participants who were exposed to medicine ball exercises within regular PE classes. The study demonstrated that the medicine ball exercises may be a safe and effective part of the PE curriculum in elementary school (Faigenbaum & Mediate, 2016). Besides traditional content of the PE curriculum like sport games, athletics and gymnastics, resistance exercises should also be incorporated, since evidence suggests they can provide substantial fitness benefits for children. References: Faigenbaum, A. & Mediate, P. (2006). Effects of Medicine ball training on physical fitness in high school physical education students. The Physical Educator, 63(3), 161-168.

CHILDREN'S MUSCULAR STRENGTH IS BETTER PREDICTOR OF ACADEMIC PERFORMANCE THAN PHYSICAL ACTIVITY.

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Introduction: Physical education accounts for a large proportion of children's overall physical activity and development of physical fitness parameters. School physical education is a continuous process of enriching knowledge, developing skills and motor abilities and important tool for formatting personality and relationships between individuals. Following literature review, there are links between physical activity and academic performance. The aim of this study was to find the most reliable predictor of academic performance in children and adolescents. Methods: Altogether, n=3461 n=3641 schoolchildren were measured with 11 physical fitness tests: physical height, physical weight, triceps skinfold, shuttle run, polygon backwards, hand grip, standing long jump, flamingo test, sit and reach, hand tapping and sit-ups. Academic performance was obtained through mathematic grade and physical activity was measured with self-report and with accelerometry on a subsample. Results: In terms of validity and reliability of physical activity measurement process, physical fitness turned out to be more reliable predictor of academic performance in children and adolescents, moreover, we can predict academic performance from repetitive and explosive strength in children and adolescents. References: None.

PHYSICAL ACTIVITY IN PRESCHOOL CHILDREN.

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Introduction: Little is known about physical activity among preschool children. The aim of this study was to describe the levels and patterns of physical activity in a sample of Slovenian and Slovenian Minority preschool children in Italy, from one to six years of age. The present study examined sex

and age differences in objectively measured physical activity. Methods: A sample of 55 Slovenian and Slovenian Minority preschool children in Italy (26 boys; average age = 4.0 years, range=1-6 years) were included in the data analysis. Physical activity data were collected by accelerometry Actigraph GT1M (Actilife, USA) during five consecutive days. Average physical activity (counts per minutes), physical inactivity, light and moderate to vigorous intensity of physical activity was assessed between 08:00 and 20.00 o'clock. Results: The amount of total physical activity increases linearly until the age of 6 years (r= 0,571; P<0.01), and there are no sex differences in the amount of total physical activity (P = 0.774). One-year olds collected 516 ± 92 cpm while 6-year olds collected 861 ± 101 cpm. Children were sedentary in average 374 ± 47 min/day (51.9 %) without sex differences (P = 0.935). Children spent 251 ± 29 min/day (34.9 %) in light physical activity with no sex differences (P = 0.878). Time spent in moderate to vigorous physical activity was 95 ± 34 min/day (13.2 %) also without sex differences (P = 0.868). Discussion: In conclusion, physical activity increases until the age of six years, independently of sex. There were no sex differences in any phenotype of physical activity. In comparison to school children, preschool children spent more time in light and moderate to vigorous physical activity and less time in physical inactivity (Volmut, 2014). However, our results cannot be generalized to the whole population. For this reason in the future a larger number of measured samples should be included. References: Ishii K, Shibata A, Adachi M, Nonoue K, Oka K (2015). BMC Public Health, 15, 1254. Volmut T (2014). Accelerometer based analysis of physical activity interventions in younger children, Univerza na Primorskem, Koper.

Physiology

INTERACTION BETWEEN MOTOR CONTROL AND COGNITIVE FUNCTIONS IN A DUAL TASK. WHERE IS THE PRIORITY?

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Introduction: Impaired behavior may be detected particularly in complex tasks (Stensdotter et al., 2013), where cognitive functioning is usually involved as well. Normal aging is associated with progressive functional loss in many cognitive domains, including working memory, attention (van Raalten et al., 2008) and executive functions (Nyberg et al., 2008), responsible for the control of behavioral activities (Miller & Cohen, 2001). Research aim was to evaluate postural control and executive function during dual tasking in old adults. Methods: Participants were 13 older healthy human males (Mean age: 70.6±5.8 years). Posturography method with a single piezoelectric force plate was using to measure postural sway activity. For the evaluation of cognitive functions, we used Word Memory task with ten audio-recorded words (Lithuanian nouns) in each trial, and the Mathematical Processing Task, where negative or positive one-digit integer-numbers (10 in total) were presented in each trial at 2-second intervals. Results: Dual-task interferences on postural sway were evident mainly in the Word Memory task condition than in the Mathematical Processing Task condition. Dual-task effect on Mathematical Processing Task and Word Memory task was not statistically different, whereas Dual task effect in the Mathematical Processing Task was generally higher than in the Word Memory task. Discussion: Taken together, we suggest that the two cognitive interferences task may make a differential impact on attentional resources deployment. However, it is also evident that participants can reduce sway activity and increase balance stability by increasing attentional control. Further research should examine whether withdrawal of attention from the balance task could account for unpredicted falls in individuals with impaired proprioceptive control.

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CORRELATION BETWEEN MECHANICAL EFFECTIVENESS AND METABOLIC EFFICIENCY DURING CYCLING.

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Introduction: To achieve top results in sports, all factors contributing to performance outcome need to be considered. Two of the most common aspects to assess cycling performance are pedalling effectiveness and metabolic efficiency. Although research showed that both aspects contribute to end performance (Hopker et al. 2010; Bini et al. 2012), the link between the two has not yet been demonstrated. In order to achieve the highest performance and efficiency, biomechanics play an important role. Cyclists are known to modify their equipment setup to improve performance. One of the common approaches includes also chainrings, which have been examined in past (Cordova et al. 2014), but with certain limitations. The purpose of this study was to examine the correlation between metabolic efficiency and pedalling effectiveness under two different biomechanical constraints; oval and circular chainrings. Methods: The study included 12 well-trained cyclists (33.8 ± 6.8 years, 72.1 ± 8.4 kg, 177.5 ± 4.9 cm), They were asked to come to the lab two times for an identical session; once with oval chainrings and once with circular chainrings. During each session they performed an incremental test until exhaustion on their own bicycle with continuous recordings of pedal forces (Forped, Ljubljana, Slovenia) and metabolic functions (Cosmed Quark CPET, Rome, Italy). Pedalling effectiveness and metabolic efficiency were computed for each cycling intensity stage until respiratory coefficient reached 1. Pearson's correlation coefficient was calculated with $p < 0.05$ considered as statistically significant. Results: Correlation between pedalling effectiveness and metabolic efficiency was not statistically significant for ($p > 0.05$) with Pearson's coefficients below 0.4. Discussion: The aim of this study was to examine the correlation between mechanical effectiveness and metabolic efficiency using a biomechanical constraint, that is oval chainrings. The results showed that there was no significant correlation. That could be due to the fact oval chainrings provoked only minimal mechanical differences and henceforth not constrained the pedalling enough to also provoke different metabolic responses. Further research is warranted in this area. References: Bini et al., 2012. Journal of Science and Cycling 2 (1): 11–24. Cordova et al., 2014. Journal of Sports Science & Medicine 13 (2): 410–16. Hopker et al., 2010. Journal of Sports Science & Medicine 9 (2): 332–37.

Physiotherapy

QUALITY OF LIFE IN ADOLESCENT'S IDIOPATHIC SCOLIOSIS BEFORE AND AFTER PHYSICAL THERAPY: A PRELIMINARY STUDY.

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Introduction: Adolescent Idiopathic scoliosis (AIS) accounts for 80% of all types of diagnosed scoliosis, occurring in 2-3% of growing age population. This disorder is very complicated and physical therapy is a very important factor in the treatment. The aim of this study is to evaluate the efficacy of physical therapy in quality of life in adolescent idiopathic scoliosis. Materials and method: This research was conducted at 56 consecutive adolescent idiopathic scoliosis patients (32 females and 24 males), aged 10-17 years, Cobb angle 10º - 40º, at Physical Therapy and Rehabilitation Clinic, UCCK-Pristine, Kosovo, during the period 2016-2017. The physical therapy protocol, including combined Schroth and Pilates exercise were performed during 3 months. The evaluation of quality of life is done by SRS-22r questionnaire at the beginning and the end of the treatment. Results and discussion: Supervised combined Schroth and Pilates exercises have provided benefit to the standard of care by improving quality of life before and after physical therapy in all components: the mean for function has improved from 3.15 to 3.45, pain from 3.23 to 5.54, self-image from 3.36 to 5.46, mental health from 3.01 to 3.35, and in overall QoL was improved from 3.30 to 3.68. Quality of life was significantly better after physical therapy ($p < 0.05$). Conclusion: The study shows that physical therapy in Scoliosis patients achieves good results in daily living life. References: None.

ANALYSIS AND IMPROVEMENT OF THE SPINE DEVIATIONS IN YOUNG FENCERS.

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Introduction: Asymmetric mechanical forces act on the fencers' spine causing muscle disbalance and impaired function. Aim of the study was the examination of the occasional spinal deviations and elaboration of a specific physiotherapy intervention for correction. Method: The group of 24 young fencers (age: 17±3.3 years) took part in the study. They had regular, intensive training programme being participants of national/international competitions. The control group at similar age was composed of 30 young people without regular sports activity. The lifestyle, injuries and pain were revealed by questionnaire. The level of the pain was recorded in a Visual Analogue Scale (VAS). The circumferences of the upper and lower extremities were measured in both groups comparing the dominant and opposite sides. The objective data about the spinal flexibility were measured by using Spinal Mouse®. Our study focused on the reduced movements of the spine in frontal plane. Based on the initial findings a 12-week physiotherapy programme containing functional training, proprioceptive elements and stabilization was constructed. Results: The circumference measurements showed asymmetry between dominant and the opposite arms (the difference was 2.23±0.52 cm in the fencers and 0.06±0.17 cm in the control group, $p<0.01$). Significant differences were not detectable in the lower extremities. The objective measurements

of the spinal lateral flexions before the training programme showed deviations from the reference values in Th2-4 and T11-L1 segments in correlation with the location of the pain. Due to the physiotherapy programme the symmetry and bilateral flexion of the spine increased ($p<0,001$). The upper back pain indicated by VAS decreased from 4.65±2.61 to 2.77±1.96 ($p<0,05$). Discussion: Results show that physiotherapy programme significantly improved the mobility, segmental flexibility and stability of the spine exposed to asymmetric load. By conclusion the integration of the physiotherapy programme to the fencers' training programme is recommended to increase the performance and to prevent injuries. Our cooperation has continued and reached another level of research. References: None.

Psychology

WHAT KIND OF PHYSICAL ACTIVITIES COULD TRANSFORM SOCIETY?

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Introduction: Sport has often been viewed as an ideal society. It is used for many purposes such as building good citizens who could be responsible for the construction of a better world. However, are these assumptions supported by scientific proofs? What does sport really transmit in terms of ethics, citizenship, responsibility or legal consciousness? This communication will focus on this topic.Method: First of all, we need to distinguish the different meanings of "sport". From a restricted and scientific perspective, sport will be hereby defined as "the physical activities which are ruled, institutionalized, and aim to make people compete". As a result, we will also consider other forms of practice such as self-organized physical activities and outdoor activities. The psychosocial idea of such a talk is that different contexts of socialization entail different types of individuals and societies. In other words, the different forms of practice transmit different ways of being in the world. Results and discussion: Contrary to common beliefs (as displayed at the very beginning of this talk), sport is not a way of transforming society but a way of reproducing it. Despite its positive values, it doesn't develop what it is told to develop. Sport is indeed associated with decrease in morality (Shields & Bredemeier, 2001; Long, 2015). It develops a vertical and reproductive citizenship since it is practiced in a very inflexible context similar to the industrial society (Long & Pantaléon, 2014). As a consequence, it transmits all the necessary social codes to integrate our societies. Outdoor activities have got similar effects on society. They mainly participate to the mainstream ideology of our contemporary society, in particular about fast paces, consumption and technology. Nature is considered as a new playground that can be dominated and transformed for our own pleasure (Long, Bazin & Bai, 2017). It is glued in the material culture (Long, Bour & Rosso, submitted). If contemplative and slow, outdoor activities can reconnect people to nature and to their nature (Long, Bazin & Massiéra, 2012). Other physical activities could transform societies: I'm talking about spontaneous and self-organized physical activities and maybe eastern traditional practices. These activities create a new way of social interactions and development. References: Long, Thierry. L'éducation par le sport: imposture ou réalité? [Education through sport: fake or reality?]. [2nd edition]. Paris: Publibook, 2015. Long, T., Bazin, D. & Massiéra, B. (2012). Mountain guides: between ethics and socioeconomic trends. Journal of Moral Education, 41 (3), 369-388. Shields, D.L., & Bredemeier, B.J. (2001). Moral development and behavior in sport. In R.N. Singer, H.A. Hausenblas et C.M. Janelle (Eds.), Handbook of Sport Psychology (pp. 585-603). New-York: Wiley.

DEFENSE MECHANISMS AND SPORT PERFORMANCE.

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Introduction: Despite evidence have indicated that coping and defense mechanisms are important to understanding the adaptation process (Cramer, 2015; Parker and Endler, 1996), very few if any studies have investigated there mutual role in sport performance. The purpose of this study was to identify the potentially distinct defense profiles of athletes to better understand the complex associations between defense mechanisms (defenses) and other important variables linked to performance in sports (e.g., coping, perceived stress and control). Methods: Two hundred and ninety-six (N = 296) athletes participated in a naturalistic study that involved a highly stressful situation: sport competition. Participants were assessed with the questionnaires Defense Style Questionnaire, Perceived Stress Scale, Mastery Scale and Coping Inventory for Competitive Sport before and after a competition. Results: Hierarchical cluster analysis and MANOVAs indicated two stable defense profiles (high and low defense profiles) of athletes. High defense profiles characterized participants who had reported high scores of immature, intermediate and mature defenses, and the opposite for low defense profile. These profiles differed with regards to coping, stress and control. Athletes with high defense profiles reported higher levels of coping strategies, perceived stress and control than athletes with low defense profiles. Discussion: This study confirmed that defenses are involved in the psychological adaptation process and that research and intervention should not be based only on coping, but rather must include defense mechanisms (Nicolas and Jebrane, 2009). In order to improve our understanding of psychological adaptation in competitive sports and to adapt mental preparation to the athletes' individual defense profile. References: Cramer, P. (2015). Defense mechanisms: 40 years of empirical research. J. Pers. Assess. 97, 114–122. doi: 10.1080/00223891.2014.947997. Nicolas, M., and Jebrane, A. (2009). Consistency of coping strategies and defense mechanisms during training sessions and sport competitions. Int. J. Sport Psychol. 40, 229–248. Parker, J. D. A., and Endler, N. S. (1996). "Coping and defense: a historical overview," in Handbook of Coping Theory Research Applications, ed. N. S. Endler (Hoboken, NJ:Wiley), 3–23.

ACHIEVEMENT MOTIVATION OF UNDERGRADUATES DIVIDED BY SPORT ACTIVITY.

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Introduction: The objective of this article is to identify the differences in achievement motivation of the undergraduates divided by sport activity. We expect statistically significant differences in the divided sample in all the dimensions of achievement motivation. Achievement motivation and anxiety enhancing performance increase with the frequent sport activity and vice versa, anxiety decreasing performance declines with higher participation in sport activity. Methods: We collected data from 248 undergraduates (male: n = 141, 22.40 ± 1.62 years old; female: n = 107, 21.78 ± 1.49 years old) from Bratislava. As research tools, we used a questionnaire which measures the level of sport activity and a standardized achievement motivation questionnaire. The Kolmogorov-Smirnov test was used to assess the normality of the data. We used the Kruskal-Wallis test and the Mann-Whitney test to test the significance of the differences between individual independent samples. The degree of dependence between two groups was

expressed using the r coefficient. Results: The results showed significant ($p \leq .01$) differences in all three components of achievement motivation. Achievement motivation of the undergraduates who participate in sports at least 3 times per week is significantly higher ($p = .00$; $r = .43$) compared to the undergraduates taking part in sports 1 or 2 times per week. Also, compared to non-participants, those undergraduates, who participate in sports 3 times and more per week, have a significantly higher level of achievement motivation ($p = .00$; $r = .48$). Discussion: Our findings, that the level of achievement motivation is conditioned by the level of sports activity, are supported by the results of previous research (Sedláčková, 2014; Scholz, 2011). A number of studies (Telama, Yang, 2000; Van Mechelen, 2002) highlight a global societal problem of decreasing number of adolescents participating in sports. Increased sport activity has not only a beneficial effect on the individual´s health but also plays a significant role in the undergraduate´s achievement motivation. References: Sedláčková A (2014). The achievement motivation and stress coping strategies of active sportsmen as compared with physically inactive population. Universitas Masarykiana Brunensis. Scholz P (2011). The comparison of achievement motivation of the students of Sports Grammar School of Dana and Emil Zatopek in Ostrava and the students of Slovan Grammar School in Olomouc. Palacky University Olomouc. Telama R, Yang X (2000). Decline of physical activity from youth to young adulthood in Finland. Medicine and Science in Sports and Exercise. 32(9), 1617-1622. DOI: https://doi.org/10.1097/00005768-200009000-00015. Van Hilvoorde L (2008). Fitness: the early (Dutch) roots of a modern industry. The International Journal of the History of Sport, 25, 1306-1325. DOI: https://doi.org/10.1080/09523360802212230.

WOMEN´S WELL-BEINNG, STATE AND TRAIT ANXIETY REGARDING THEIR SPORT ACTIVITY.

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Introduction: The aim of the paper is to identify the level of women's wellbeing regarding their sport activity, whereby we assume that athletes will have a higher level of wellbeing. The second aim is to determine the relationship between the individual dimensions of wellbeing and the level of state anxiety and trait anxiety. We expect that the positive dimensions of wellbeing will correlate indirectly with the level of state anxiety and on the contrary, the negative dimensions of wellbeing will directly correlate with the level of state anxiety. Methods: The research group consists of 107 women (20.03± 1.47 years), divided into groups based on their sport activity (active 62, inactive 45). We used the BDP questionnaire (Grob et al., 1991 in Dzuka 1995), which contains 2 positive and 3 negative dimensions, to determine the level of wellbeing. We used the STAI questionnaire by Spielberger et al., 1970, in Ruisel et al., 1980), to determine the level of anxiety. The data were processed statistically. We used the Kolmogorov-Smirnov test to test the normality of the data and Mann-Whitney U-test to test the differences between the samples. We also used the Pearson correlation to calculate the effect size coefficient r and for the strength of the relationship between variables. Results: We recorded a higher value of personal well-being in the sample of women actively participating in sport activities. In both the samples, we found an indirect relation between positive dimensions of personal well-being and state anxiety (in the case of the sample of women not participating in any sport activity even with trait anxiety). A direct relation between the negative dimensions of wellbeing and the level of state as well as trait anxiety was recorded only in the sample of women not participating in any sport activity. Discussion: Our results correspond with other findings which suggest that regular sport activity increases the level of women´s personal well-being (Penedo

and Dahn 2005). In the same time, our results partially correlate with research according to which state anxiety (Diener et al. 1999) and trait anxiety (DeNeve and Cooper 1998) tends to influence subjective personal well-being negatively. Our findings indicate that sport activity can be a suitable instrument to increase people´s personal well-being. References: Deneve KM, Cooper H (1998). A meta-analysis of 137 personality traits and subjective well-being. Psych Bull, 124, 197 - 229. Diener E. et al (1999). Subjective well-being: Three decades of progress. Psych Bull, 125(2), 276-302. Džuka J (1995). Faktorová analýza modifikovanej verzie Bernského dotazníka subjektívnej pohody (BDP). Československá psychologie, 39(6), 512-522. Penedo FJ, Dahn JR (2005). Exercise and well-being: a review of mental and physical health benefits associated with physical activity. Curr Opin Psychiatry,18(2), 189-193. Ruisel I, et al (1980). Dotazník na meranie úzkosti a úzkostlivosti: príručka. Bratislava: Psychodiagnostika.

"AS DU COEUR" STUDY: A RANDOMIZED CONTROLLED TRIAL ON PHYSICAL ACTIVITY MAINTENANCE IN CARDIOVASCULAR PATIENTS.

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Introduction. Although the benefits of supervised physical activity programs in cardiac rehabilitation have been well documented, the amount of physical activity often drops quickly after the end of the supervised period. This trial (registered as ISRCTN77313697) evaluates the effectiveness of an experimental intervention based on habit formation theory applied to physical activity maintenance. Methods. Cardiovascular patients (N=47) were individually randomized into two groups. Two supervised physical activity (SPA) sessions per week were offered to the first group for 20 weeks. Progressively autonomous physical activity (PAPA) was offered to the second group as follows: 10 weeks of the same supervised program as the SPA group followed by 10 more weeks in which one supervised session was replaced by a strategy to build and sustain the habit of autonomous physical activity. The primary outcome was the amount of physical activity measured by the International Physical Activity Questionnaire (IPAQ; Craig et al., 2003). To compensate for the limited capacity to recruit subjects, multiple IPAQ measurements were made (at 0, 5, 7, 9 and 12 months after the start of the intervention) and analyzed using a mixed model. Changes in physical condition, automaticity of the physical activity behavior, motivation, and quality of life were examined. Results. Results showed no significant difference between the two groups in physical activity behaviors after the program, nor in physical condition, motivation, or behavioral automaticity. Discussion. However, the PAPA group completed more PA sessions during the intervention, and their quality of life was significantly higher than that of the SPA group at 12 months, suggesting that despite a smaller number of supervised sessions, a progressive autonomy PA program led to the same or even higher positive outcomes than the fully supervised PA program. References: Craig, C. L., Marshall, A. L., Sjöström, M., M., Bauman, A. E., Booth, M. L., Ainsworth, B. E.,… Oja, P. (2003). International Physical Activity Questionnaire: 12-country reliability and validity. Medicine & Science in Sports & Exercise, 35(8), 1381-1395. Ramadi, A., Haennel, R.G., Stone, J.A., Arena, R., Threlfall, T.G., Hitt, E., Martin, B.-J. (2015). The sustainability of exercise capacity changes in home versus center-based cardiac rehabilitation. J Cardiopulm Rehabil Prev, 35(1), 21–8.

EFFECTS OF MENTAL AND PHYSICAL TRAININGS IN MOTOR SKILL IN SOCCER.

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Introduction: Motor imagery with mental practice is a non-invasive technique in which physical tasks, scenarios, or both are imagined and cognitively rehearsed, usually without voluntary physical movements. It is a dynamic state during which the representation of a specific motor action is internally activated without any motor output (Wu et al., 2010). The present study aimed to explore the possible role of motor imagery in the learning of complex motor skill in soccer (head kick). Methods: The sample of study consisted of 40 university students were assigned (18 female, 22 male) to either mental practice (motor imagery) with physical training, or physical training alone (mean ± s: 20.54 ± 1.8). Head kick performances were applied and assessed pre and post an eight-week soccer course. A video analysis was implemented by three experts on the head kick pre and post course. One-Way ANOVA was used to determine the difference between experiment and control group results in two conditions and Dunnentt's C Test was used for determining the differences across groups through SPSS Package 21.0. Results: The mental practice group showed greater improvement in performance than the control group. Five repeated measures 2 groups (experiment & control) X 2 times (pre & post course) ANOVAs applied to test the significance of the differences observed in the two conditions. Results of the ANOVA showed a significant effect of training condition on "Timing" [$F(1, 38) = 5.603$, $p < .05$, $\eta 2 = .078$] and significant effect of training condition on "Coordination" [$F(1, 38) = 4.247$, $p < .05$, $\eta 2 = .070$], and significant effect of training condition on "Positioning" [$F(1, 38) = 4.803$, $p < .05$, $\eta 2 = .069$], whereas the other feature (Landing) did not significantly differ between two conditions. Discussion: Findings indicate that combined mental and physical practice can improve performance of a soccer head kick that is a closed sport skill. Scientific attempts' findings those are applied in different sport branches introduced partially similarity with ours (Guillot; 2009; Post et al., 2010; Gaggioli et al. 2013). References: Gaggioli, A., Morganti, L., Mondoni, M., Antonietti, A., (2013). "Benefits of Combined Mental and Physical Training in Learning a Complex Motor Skill in Basketball". Psychology, Vol:4 No:9A2, p: 1-6. Coelho, R. W., De Campos, W., Da Silva, S. G., Okazaki, F. H., & Keller, B. (2007). Imagery intervention in open and closed tennis motor skill performance, Perceptual and Motor Skills, 105, 458-468.

Rehabilitation

EFFECTS OF EXERCISE IN HEMODIALYSIS PATIENTS: STUDY DESCRIPTION.

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Introduction: Systematic literature review shows that physical activity has many positive effects on the health of dialysis patients. Many previous studies report the effects of intradialytic training on a customized ergometer, which can currently be considered as the gold standard of the training type for dialysis patients. The aim of our study is to determine the effect of functional exercise and training counseling by kinesiologist in addition to the basic exercise program of cycling during dialysis on physical performance of dialysis patients. Methods: Our study will include approximately 80 dialysis patients. We will first test their physical condition with selected motor tests. After that we will randomize patients in two groups -

one experimental and one active control group. The experimental group will attend a guided functional exercise before the dialysis procedure and then perform a cycling session during dialysis in the first phase of the study, which will last for 8 weeks. In the second phase of the study for additional eight weeks they will be instructed to exercise at home using the skills mastered during the first phase of the study on non-dialysis days, but continue with the program of intradialysis cycling. We will give them advice, monitor and motivate them. The active control group will perform intradialytic exercise (intradialysis cycling equal to cycling program of experimental group) during dialysis procedure for four months. We will repeat the baseline tests after eight and after sixteen weeks. Results: The primary end-point of the study is the result of 10-repetition sit-to-stand test. Our hypothesis is that the guided functional exercise under the surveillance of a kinesiologist added to intradialysis cycling program statistically significantly improves patient's physical performance as compared to the program of intradyialsis cycling alone. Discussion: According to the literature review, we can say that physical activity has a positive impact on dialysis patients. In Australia, the intradialytic cycling exercise pilot program was so successful that more than 70% of the patients now participate in such training program (Cheema, Smith and Singh, 2005). The advantage of this type of program is also the constant presence of a kinesiologist during the exercise (Davis and Holcombe, 2011). References: Anderson JE, Boivin MR, Hatchett L. Effect of exercise training on interdialytic ambulatory and treatment-related blood pressure in hemodialysis patients. Ren Fail. 2004; 26(5):539-544. Cheema B., Smith B., Singh, M. A rationale for intradialytic exercise training as standard clinical practice in ESRD. Am J Kidney Dis. 2005; 45(5):912-916. Davis JS, Holcombe J. Intradialytic exercise: A pilot program. Dial Transplant. 2011; 40(6):258-260. doi:10.1002/dat.20584. Heiwe S, Jacobson SH. Exercise training in adults with CKD: a systematic review and meta-analysis. Am J Kidney Dis. 2014;64(3):383-393. doi:10.1053/j.ajkd.2014.03.020.

Sociology

PHYSICAL ACTIVITY OF OLDER ADULTS - GENDER AND AGE-RELATED CHARACTERISTICS.

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Introduction: The research of physical activity (PA) of older adults needs different approach (Stuck et al., 1999) so the intention of this abstract was to focus on PA domains of older adults related to gender and age groups. Results will serve us to identify possible motivators or constrains of older adult's participation in suitable PA programs for elderly population. Methods: The sample consists of 445 older adults from Slovenia, 63,7 % female (age 66.8 ± 5,1 years) and 36,7% male (age 68, 3 ± 5,5 years). Data were obtained in the frame of Interreg project "PANGeA - Physical activity and nutrition for greater ageing" within the questionnaire where The Global Physical Activity Questionnaire (GPAQ) was a part of it. PA was assessed in three domains: i) activity at work, ii) active transport and iii) recreational sports activities. Assessment of PA was analysed in MET (Metabolic Equivalent). The PA intensity was obtained in three levels of physical activity suggested for classifying i) inactive person (<600 MET-min/week), ii) minimally active (600-3000MET-min/week) and iii) HEPA active (>3000 MET-min/week - health enhancing physically active). Additionally, IBM SPSS Statistics 22.0 software was used for data analyses. Results: Gender differences were not shown as significant at all age groups. Quantity of PA is gradually decreasing over the years, in age group 1 (59 - 64 years) was in favour of women at all

domains, while in age group 2 (65 – 70y) in favour of men. In the age group 3 (71-75y) and group 4 (from 76y on), women achieved higher MET-min/week in domain of activity of work and total MET-min/week than men, while men achieved better score in the domain of recreational sport activities. From the point of recommended level of PA; 62,3% of women and 67,7% of men exceed HEPA active level and only 4% of men and 10% of women were recorded as inactive. Discussion: Self-reported data of total PA (MET-min/week) suggested possibility that quantity of PA on a daily base was overestimated, especially in the domain of activity of work (gardening), because of seasonally conditioned data collection in spring. Result also confirmed previous studies that men are more involved in recreational sports activities than women, (Blade et al. 2003), while the activity at work (gardening, housework and work in orchard or. vineyard), was presented as the dominant activity of active older adults. References: Blade, A.; Figures, J.; Hawking D. A. et al. (2003). Physician advice to the elderly about physical activity. J. of Aging and PA, 11; 90-97. Stuck, A.E.; Walthert, J.M.;Nikolaus, T.; Bula, C.J.; Hohmann, C.; Beck , J.C. (1999). Risk factors for functional status decline in community-living elderly people: a systematic literature review. Soc.science and Med. J., 48, 445-469.

Sport Management

THE INFLUENCE OF JOB AUTONOMY ON JOB SATISFACTION IN PERSONAL TRAINERS.

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Introduction: Job satisfaction is a topical topic of considerable interest to fitness club employers due to high turnover in recent years. The study aimed to investigate the influence of job autonomy on job satisfaction in personal trainers in Thailand. Method: The data was collected from randomly selected 433 personal trainers employed permanently in fitness clubs in various regions of Thailand. The questionnaire was distributed and collected digitally for three months. The respondents are competent in evaluating their job autonomy and job satisfaction as employees. The variables under study are of five-point Likert scale. Regression was employed to test the relation between job autonomy and job satisfaction. Results: The hypothesis posited a positive and significant relationship between job autonomy and job satisfaction in personal trainers. This relationship indicates that the greater the job autonomy at the workplace, the more the personal trainers feel satisfied with their work. Discussion: The current findings support the hypothesis that job autonomy affects job satisfaction. It is important for workers to be happy in their work, given the amount of time they have to devote in their workplace. Personal trainers should be given the authority to make decisions about the services they render and any top-down imposition of change is counter to the development of professionalism. The findings demonstrate that the greater the propensity for job autonomy, the greater the propensity for personal trainers to be satisfied with the job. Llorente and Macias found that the degree of job satisfaction is highly and statistically related to job satisfaction. They tend to work with contentment when they are granted autonomy to make decisions in their work. References: Fulford, M. D., & Enz, C. A. (1995). The impact on empowerment on service employees. Journal of Managerial Issues, 7, 161-175. Landeweed, J. A., & Bouman, N. P. G. (1994). The effect of work dimensions and need for autonomy on nurses' work satisfaction and health. Journal of Occupational and Organizational Psychology, 67, 207-217. Llorente, R. M. B., & Macias, E. F. (2005). Job satisfaction as an indicator of the quality of work. Journal of Socio-Economics, 34, 656-673. Morgeson, F. P., Delaney-

Klinger, K., & Hemingway, M. A. (2005). The importance of job autonomy, cognitive ability, and job-related skill for predicting role breadth and job performance. Journal of Applied Psychology, 90, 399-406.

IDENTIFYING EDUCATIONAL WASTE IN CLASSROOMS AT PHYSICAL EDUCATION DEPARTMENT.

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Introduction: One of the most important factors that can affect a country's progress is the role of universities. To properly play this role, one of the major and most fundamental of elements is the quality of education (Reza, Rezapour,and Salmanpour, 2016). The present work makes a comparative study between educational waste in the physical education department in Balzer's (2010) model and that of Iranian Universities, and it aims at not only comparing these two models, but also determining their similarities and differences in a comparative way. Methods: The method used in this qualitative analysis study is an internal one with regard to William Balzer's model. Data were collected by semi-structured interviews in nominal groups. The statistical population was the faculty members of different educational groups, graduate and PhD students of physical education and sport science at the Physical Education Department of Allameh Tabataba'i University. At first, 10 people were selected purposefully and then the interview continued until theoretical saturation, so that at the end 20 people were interviewed. Results: According to the interviews analysis and Balzer's model, 4 objectives were determined in Iran, including waste of human resources, process waste, waste of assets, and waste in information management. Discussion: The obtained results led to changes in Balzer's model, so that there were no significant changes in the waste of human resources. In the waste of process, sub-criteria of ineffective control, unreliable processes, sub-optimization, and error correction were removed. The information criterion in Balzer's model was renamed as information management and sub-criterion of losing information was merged with information loss due to lack of use. The sub-criterion of waste of information translation was removed and instead the sub-criterion of utilization of systems and information centers was added. Finally, in the criterion of waste of assets, sub-criteria of unnecessary transfer and fixed assets were eliminated. References: Reza,H. Rezapour,Y. Salmanpour,S. (2016). Evaluation indexes in higher education based on Kano`s model at Urmia University. Scientific and Research Journal of Education and Evaluation, 9 (34), 35-50. Balzer, W.K. (2010). Lean Higher Education: Increasing the Value and Performance of University Process, CRC Press, Boca Raton, FL, 184-195.

BULLYING AND HARASSMENT AS SUBSET OF ANTISOCIAL BEHAVIOR IN SPORT: THEORETICAL CONCEPTS.

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Introduction: Frequently the sport is regarded as a platform for many social goals and issues therefore it could not be analyzed outside of a society. But here are quite vividly observed manifestations of the antisocial behavior of its members. Increasingly, such behavior is also recorded in sports, recognizing it as intolerable. So far, there is a lack of empirical research analyzing quantitative manifestations of antisocial

behavior in sport, as well as theoretical insights, more revealing all possible subsets of antisocial behavior. The aim of this study is to discuss theoretically the bullying and harassment as subset of antisocial behavior in the sport. Methods: This study is prepared by using the methods of analysis and synthesis of scientific literature. The methods of comparison and analogy are also used, and the authors' insights and generalizations are provided. Results and discussion: While the sport is expanding and growing number of people are involved into the sport activities, the necessity of qualitative growth is emphasized. These issues are tied with the growing awareness that all athletes should take part in 'the safe sport', which according to Mountjoy et al. (2016) could be understood as an athletic environment free of all forms of non-accidental violence. Unfortunately, the antisocial behavior of sport participants, which manifests itself as non-accidental violence, becomes a particularly serious social problem in the sport. Athletes involved in the antisocial behavior with teammates or opponents tend to display not only lower results (Sofia, Cruz, 2017) but this antisocial behavior might affect their physical, social, or psychological health and even their sport organization and the image of the sport itself (Mountjoy et al., 2016). An analysis of scientific literature about the antisocial behavior of athletes based on non-accidental violence has led to the exclusion of several subsets of antisocial behavior in the sport. This is abuse, hazing, harassment and bullying (Vveinhardt et al., 2017; Tofler, 2016). However, the greatest negative consequences are recognized as harassment and bullying, which occur in various forms: physical, verbal and psychological, sexual, social, and cyber. References: Mountjoy M, Brackenridge C, … & Starr K (2016). International Olympic Committee consensus statement: harassment and abuse (non-accidental violence) in sport. Br J Sports Med, 50(17), 1019-1029. Sofia R, Cruz JF (2017). Unveiling anger and aggression in sports: The effects of type of sport, competitive category and success level. Revista de psicología del deporte, 26(2), 21-28. Tofler IR (2016). Bullying, hazing, and workplace harassment: the nexus in professional sports as exemplified by the first NFL Wells report. International review of psychiatry, 28(6), 623-628. Vveinhardt J, Komskiene D, Romero Z (2017). Bullying and harassment prevention in youth basketball teams. Transformation in Business & Economics, 16(1), 232-251. Acknowledgement: This research is/was funded by the European Social Fund according to the activity 'Improvement of researchers' qualification by implementing world-class R&D projects' of Measure No. 09.3.3-LMT-K-712.

MEDIA COMMUNICATIONS IN SPORTS ORGANIZATIONS.

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Introduction: The paper will give theoretical and practical approach to media communications in sports organizations. In first part of paper, will be present theoretical aspects of media communications in sports organizations through history and time, by leading authors in the field of sports management. Modern sports communications comes from traditional form of experiences to integrated, holistic approach, which includes information technology platforms, modern presentations of sports events, interactive discussion with audiences, by using of social media. In second part of paper, will be present theoretical aspects of sports journalism in era of modern media communications. There is emphasizing that all aspects of media communications, have impact in leading of sports organizations and sports events. In the paper is emphasizing that new sports audience generation need integrated, modern approach, based on both traditional and modern media communications, as well as, new approach to sports journalism. Young generations love to share experiences about. Methods: In the paper will be present empirical research about implementation of media communications in sports organizations. Empirical research will be including

questionnaire and focus groups by sports people, sports managers and audiences about their new needs, wishes and feelings in sports events. As good example will be present Manchester United and Sport Club. Results: According to theoretical and empirical research results shows that media communications in sports organizations have to be clear, fast and inspirational. In that way media communications of sports organizations have great social responsibility in their communications. Discussion: From theoretical aspects, it is important to be transparent and open, as sports organizations. (Kotler, 2016) In that way media communications in sports organizations have to be social responsible and inspire. (Kennet, 2008) Journalists have tasks to improve media communications with audience through social media. Empirical research emphasizes that future of media communication in sports lie in integrated media communications through social media. References: Belch, G., Belch, M. (2012). Advertising and Promotion-An Integrated Marketing Communications Perspective. New York: McGraw-Hill. Blakeman, R. (2006). Integrated Marketing Communication. Toronto: McMillan. David, P. (2005). Integrated Marketing Communication. Toronto: Elsevier Inc. Larry, P. (2008). Strategic Integrated Marketing Communication. Toronto: Elsevier Inc. Kennet, C. (2008). Integrated Advertising, Promotion and Marketing Communication. New York: Prentice Hall.Kevin, R. (2004). The Future Beyond Brands - Love marks. New York: Power House Books. Kotler, Ph., Keller, L. (2016). Marketing management. London: Prentice Hall.

USING THE CONCEPT OF SPORT BUSINESS INTELLIGENCE IN EVALUATING SPORT POLICIES.

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Introduction: Sport policy documents reflect political commitment to take action for achieving the recommended levels of physical activity of the population and are important measures of accountability (Bull et al., 2004; Schmid et al., 2006). But there is a lack of research of how these sport policies are addressing the issue of physical fitness using the performance indicators based on real and available data. Therefore this paper aimed at reviewing and analysing of recent regional sport policies in Czech Republic with a focus on the performance measures using the concept of Sport Business Intelligence (Rasku et.al, 2015). Methods: Desk research method and systematic content analysis were conducted on sport policy documents in selected cities and in all 14 Czech regions. The data was collected from phone survey on the topic of monitoring physical activity of the population. Respondents were heads sports departments of cities with 50 000 or more inhabitants (n=35; return rate 70 %) and heads of the sports departments in (n= 10; return rate 71%) Czech regions. Results: The results showed that sport strategies in selected Czech cities and regions in general contain aggregate goals that address physical activities but there is a lack of measurable targets and indicators that would enable the evaluation of the regional development in the physical activity, physical fitness and health. Cooperation with other sectors is envisaged as well. The results from phone survey showed that few cities and regions implemented projects regarding the basic diagnosis of the health status of citizens. Limited cross departmental cooperation in the implementation of sport policies and lack own or borrowed data have been also proved. Discussion: Insufficient array of indicators related to the changes in population physical activity as a result of sport polices implementation in Czech sport policies is related to the insufficient data warehousing and data mining to design and evaluate the sport policies. Internal alignment of performance indicators and data collections on different levels of the municipality and regular update of the indicators is condition for having a balanced picture in relation to the sports policies performance as a whole. References: Bull, F.C., Bellew, B, Schöppe, S.

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ORGANIZATIONAL TRANSFORMATION IN SPORTS CLUBS.

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Introduction: The purpose of this study was to examine the effects of information age dynamics on the organizational management paradigm and identifies the management styles and principles that can be applied in sports clubs. Methodology: This research was examined in accordance with qualitative research method. It was also primarily utilized the descriptive analysis method in order to understand what the collected data said or what results revealed relating to research problem. Result: In sportive function areas, sports club management has to be divided administratively and technically into two main areas, to display the task differences of these areas and to provide power balance. In order to enable the sports clubs to achieve this goal; with the management of an effective personnel administration with the process control approach as is the case in businesses located in other service sectors; Adapting new technologies to business processes, Transferring business models to organizational structure in the new digital world, Keep track of where you are in the value chain. Discussion: Institutional success in Information Age organizations is to move the current situation to better conditions and to create value by making it permanent. The aim of the establishment of professional sports clubs is to be able to successfully maintain the sport services and applications. Sustainable sporting success gives clubs more strength in branding and more support from club supporters. References: Christoph, B & Thiel, A, 2011 'Sport Management' Beta release. p.3. Chacko, G.K. 1979 'Management Information System', Princeton, New York; Petrocelli Books, INC. s.23. Davis, Gordon B. 1974 'Management Information Systems; Conceptual Foundation Structure and Development', Mc.Graw-hill Book Company, New York, S. 117. Dıxon, N. 1994 The Organizational Learning Cycle: How we can Learn Collectively, McGraw-Hill Book Company, London. İşcan, N.,F, Atilhan, 2005 Digital Age Organizations, Beta Publications,Istanbul, 200.

Sport Tourism

IS MONTENEGRO CONSIDERED AS A SPORT-RECREATIONAL DESTINATION?

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Introduction: Tourism is considered as the main economic and employment generator in Montenegro. However, since the competition between tourist destinations continues to increase, destination marketers should find new products that differentiate Montenegro from other destination and due attract tourist. One of the mechanism that could differentiate Montenegro, as touristic destination, could be oriented on sport

offer. Actually, previous scholars (Chalip and Costa, 2005; Higham, 2005) underlined that sport can act as a tool for destination branding and generators of tourism-related financial, social, and environmental impacts. Therefore, the main objective of this paper is to empirically examine is Montenegro considered as a sport-recreational destination. Methods: The data is extracted from the Montenegrin survey called Guest Survey 2014. The creation of the database is organized by the National Tourism Organization of Montenegro. The main objective of the survey is to obtain representative view regarding tourist travel behavior and satisfaction during their stay in Montenegro. The questionnaire contains 35 questions and it was translated in several languages. In order to analyze our main research question, we will first provide descriptive statistics concerning the motives of tourist to visit Montenegro (one of the question is related to sport-recreational activities). Furthermore, we will check causal link between tourists' motivation related to sport and recreational activities to come in Montenegro and their overall satisfaction with sport and recreational activities. Results: Our preliminary results show that only around 3% of tourists in our sample that visited Montenegro as the main motive for visiting indicated sport and recreational activities, around 4% of tourists indicated sport and recreational activities as second motive while around 5% of tourists indicated sport and recreational activities as the third motive. Furthermore, around 60% of tourists reported that they were satisfied with overall sport-recreational activities during their stay in Montenegro. Discussion: This study shows that even that Montenegrin sport-recreational offer is on the satisfactory level, managers and policy-makers should provide additional effort to present Montenegro as a sport-recreational destination since very low percentage of tourists are motivated to visit Montenegro related to these activities. One of the mechanism that could help Montenegro to become more recognized as sport-recreational destination is organization of sport events that are being used regularly to build the brand of their host destinations (Chalip and Costa, 2005). References: Chalip L, Costa CA (2005). Sport event tourism and destination brand: Towards a general theory. Sport in Society, 8(2), 218–237. Higham J (2005). Sport tourism destinations: Issues, opportunities, and analysis. Oxford: Elsevier

Sports Medicine

CAN EXERCISE-BASED INTERVENTIONS PREVENT RUNNING-RELATED INJURIES? EVIDENCE FROM RANDOMIZED CONTROLLED TRIALS.

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Introduction: Runners are at relatively high risk for sustaining an overuse injury (van Gent et al., 2007). While many risk factors have been documented so far, previous reviews have mostly failed to identify effective interventions to lower injury risk in runners (Yeung, Yeung & Gillepsie, 2011). Methods: We conducted a meta-analysis of randomized controlled trials on two types of preventive interventions – exercise-based interventions and training-modification interventions, regarding running-related injury prevention. We searched through several databases with no date or language restrictions, using following key words: running injury prevention, running injury therapy, running injury incidence, running injury exercise and running injury risk. Studies were included if they were a randomized controlled trial or prospective cohort study, investigated the effects of movement therapy or training modification interventions, contained a population of runners or other populations, involved in running (e.g. military recruits), and reported lower extremity injury incidence rates specific to running. Results: In total, 4935

citations were identified, 69 of which were retrieved for full-text evaluation. Seven articles met the inclusion criteria and were included in meta-analysis. Two separate meta-analyses were carried out for both intervention types. First meta-analysis showed no preventive effects of movement therapy interventions, with an overall risk ratio of 0.98 (p = 0.81, I2 = 42 %). The second meta-analysis showed no overall preventive effect of training modifications, with an overall risk ratio of 0.78 (p = 0.35, I2 = 79%). Discussion: No evidence was found to support the preventive effects of movement therapy or training modification. This may primarily be due to non-optimal intervention designs, such as using inappropriate placebo exercises. For instance, Brushoj et al. (2008) used trunk strengthening in control group, which may affect trunk stability and consequently improve the kinematics of lower limbs. Preventive programs may also be more effective when carried out prior to running program onset. For now, we recommend that clinicians scan each individual for risk factors, know to increase running-related injury incidence, and address those directly. References: Brushoj C, Larsen K, Albrecht-Beste E, Nielsen MB, Loye F, Holmich P (2008). Am J Sport Med, 36(4), 663-670. Van Gent RN, Siem D, van Middelkoop M, van Os AG, Bierma-Zeinstra SM, Koes BW (2007). Br J Sport Med, 41(8), 469-80. Yeung SS, Yeung EW, Gillepsie LD (2011). Cochrane Database System Review, 6(7), CD001256

Training and Testing

DIFFERENCES OF UNILATERAL AND BILATERAL IMBALANCES OF ISOKINETIC STRENGTH IN TWO YOUNG ELITE SOCCER TEAMS.

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Introduction: The aim of this study was to characterize differences of bilateral and unilateral imbalances of isokinetic strength in two young elite soccer teams. The strength disproportionateness between the lower extremities and asymmetry between the muscles agonists ad antagonists leads to a crucial problem for soccer payers (Rahnama et al., 2005 Fousek et al., 2010). Imbalance of movement can indicate an inaccurate mechanism of the total body transfer, and it can initiate the injury of players (Grygorowicz et al., 2010). Material and method: In this study was examined the group of 40 young elite soccer players of categories U16 and U19. Isokinetic strength parameters we monitored using an isokinetic dynamometer (Cybex Humac Norm ®, USA). It was tested the highest peak torque (PT) knee extensors and flexors on preferred and non-preferred leg in concentric contraction at angular speed of 60 °/s. Before examinations players done a short warm-up. Results: It was found out the higher rate of muscular strength between flexors and extensor of knee on both lower extremities in category U16 (dominant leg – 58.9±7.8%, non-dominant leg – 57.2±7.9%) in compare of category U19 (dominant leg – 57.7±9.4%, non-dominant leg – 55.8±7.5%). Total average bilateral asymmetry of extensors of knee in both teams was just 3.8±3.1%, average bilateral imbalances for extensors of knee was 9.9±9.8%. Discussions and conclusions: Results showed high stability of bilateral asymmetry of extensors of knee. In contrast, the parameter of extensors of knee bilateral imbalances revealed high variability, what indicate bad strength profile of athletes and can leads to injuries. References: Fousekis, K., Tsepis, E., & Vagenas, G. (2010). Lower Limb Strength in Professional Soccer Players: Profile, Asymmetry, and Training Age. Journal of Sports Science & Medicine, 9(3), 364-373. Grygorowicz, M., Kubacki, J., Pilis, W., Gieremek, K., & Rzepka, R. (2010). Selected isokinetic tests in knee injury prevention. Biol Sport, 27(1), 47-51. Rahnama, N., Lees, A., & Bambaecichi, E. (2005). A comparison of muscle strength and flexibility between the preferred and non-preferred leg in English soccer players. Ergonomics, 48(11-14), 1568-1575.

COMPARISON OF MOTOR DETERMINANTS OF YOUNG FOOTBALL PLAYERS.

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Introduction: The further, the more demands for physical fitness and training in elite junior football competitions on players are stepping up. In order for players to cope with the physiological requirements of football, they must be adequately prepared. They are highly demanded, constantly tested, and according to the results in health and physical tests, as well as the potential for new clubs. We focused on youth and to find out whether the physical condition influence their inclusion into the youth representation of the Czech Republic. Methods: The sample consisted of 67 players from national team and 147 players of the highest level Czech league in U18 and U19 categories. Results: National team players achieved better results in comparison with elite league players in all tests. Significantly better results were observed just in acceleration and endurance tests. Discussion: No significant differences between national and top league players may shows that we have well prepared both groups. From other studies we know that players in our research group achieved lower level in physical preparedness. Compared with youth players from other studies (thus, from other countries and teams), it is necessary to realize that the differences in performances may be attributed to various factors such as different training methods, length of participation in the training process and categorization into higher age categories. Villanueva et al. (2011) states that compared with anthropometric characteristics, the biological maturity level of players is a very important determinant, which significantly impacts the test results. Therefore, we believe that it is an important factor to consider when evaluating and comparing results of individual age categories. Furthermore, the performance levels of players are important because several studies (Comfort, Bullock & Pearson 2012) identified differences between elite players and players at lower performance levels. References: Helgerud, J.; Engen, L.C.; Wisloff, U.; Hoff, J. Aerobic endurance training improves soccer performance. Med. Sci. Sports Exerc. 2001, 33, 1925–1931. Krustrup, P.; Mohr, M.; Ellingsgaard, H.; Bangsbo, J. Physical demands during an elite female soccer game: Importance of training status. Med. Sci. Sports Exerc. 2005, 37, 1242. Hoff, J. Training and testing physical capacities for elite soccer players. J. Sports Sci. 2005, 23, 573–582. Impellizzeri, F.M.; Rampinini, E.; Marcora, S.M. Physiological assessment of aerobic training in soccer. J. Sports Sci.2005, 23, 583–592. Bangsbo, J. The physiology of soccer—With special reference to intense intermittent exercise. Acta Physiol. Scand. Suppl. 1993, 619, 1–155. Mendez-Villanueva, A., Buchheit, M., Kuitunen, S., Douglas, A., Peltola, E., & Bourdon, P. (2011). Age-related differences in acceleration, maximum running speed, and repeated-sprint performance in young soccer players. Journal of Sports Sciences, 29(5), 477-484.

MEASURING THE INFLUENCE OF PLAYING ACTIVE VIDEO GAMES ON THE PROCESS OF DEVELOPMENT OF TENNIS TECHNIQUE IN 7-9 YEARS OLD CHILDREN.

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Introduction: Active video games (hereinafter AVG) represent a new video games generation that introduced controllers and motion sensing input devices, for which a whole body physical interaction is required while playing. Those games express the most authentic replication of real experiences, can track

full-body movements in three dimensions, can measure reaction times, accelerations and detect the speed of a player's movement (Staiano & Calvert, 2011). Video games in modern society are increasingly part of our daily life, especially among adolescents. According to Fulton et al. (2012), 40% of adolescents play video games at least once a week, 83% of Americans aged between 8 and 18 have at least one AVG console at home while 56% have two or more (Rideout, Foehr and Roberts, 2010). The purpose of this study was to measure the effect of a continued AVG playing on the tennis technique development during the training process. Methods: The data was collected from 55 (male: 30; female: 25) tennis players aged from 7 to 9 year old from the local tennis club (TK Koper). They were randomly divided in two different groups, the AVG (27 participants) and the control one (28 participants). To the experimental AVG group was added half an hour of playing the AVG Virtual Tennis 4 on a Xbox Kinect device two times a week immediately after the training process. Both groups take part in a training process for 12 weeks. The improvement in the forehand and backhand stroke technique was verified using the Tennis Rating Score for Children (TRSC). Results: The average participation at the training sessions was 87.5% for the AVG group and 89.6% for the control group. Participants who completed less than 20 training sessions were excluded from the study. From the initial randomized sample 91.6% of the participants complete all the final measurements. Conclusions: The results of our study can show the importance of playing/not playing AVG in children while being in the early process of tennis training program, and better understand the impact of AVG games on players' physical skills. Detailed results will be further presented at the conference. References: Staiano, A. E. in Calvert, S. L. (2011), Exergames for Physical Education Courses: Physical, Social, and Cognitive Benefits. Child Development Perspectives, 5, 93–98. Fulton, J.E., Song, M., Carroll, D.D., Lee, S.M. (2012). Active video game participation in U.S. youth, Findings from the National Youth Physical Activity and Nutrition Survey, 2010. Circulation, 125, AP260. Rideout, V.J., Foehr, U.G. in Roberts, D.F. (2010). Generation M2: Media in the Lives of 8 to 18 year-olds. Kaiser Family Foundation. Retrieved from files.eric.ed.gov/fulltext/ED527859.pdf

EVALUATION OF SOME MOTORIC PARAMETERS AND RELATIONS OF PRE-SCHOOL GYMNASTS.

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Introduction: The aim of this study is to determine some motoric parameters of pre-school gymnasts and to investigate the relationship between them. Methods This study is conducted on 30pre-school rhythmic gymnasts aged 7.Eurofit Physical Ability Test was applied to the subjects. Measurements regarding resting heart rate, blood pressure, height, weight, flamingo balance test, tapping plate, standing long jump, 30 seconds sit-up test, reaction tests, sit and reach, hand dynamometer, bent arm hang and 10x5m run. Firstly, descriptive statistics is performed for all data. In order to determine the relationship between some parameters, Pearson Correlation coefficient is calculated to investigate the direction and strength of the linear relation for normally distributed data. Spearman Correlation coefficient is calculated for data not distributed normally. Results An inverse correlation is found between long jump and 10x5m and also between long jump and plate tapping test. It is concluded that there is an inverse relation between flamingo balance test with plate tapping test and plate tapping test with sit and reach flexibility test. Same directional relationship is only determined between long jump with flamingo balance test. Discussion Sit and reach distance is found as 27,03±3,97cm.It is clear that flexibility values of gymnasts are higher than those at the same age who are not gymnasts. It is considered to stem from the fact that flexibility is one of the most important

motoric abilities gymnastics necessitates. Regular gymnastics trainings have improving effect on flexibility on children. The sit-up test results of the study seem to be consistent with the literature .Little differences are considered to stem from differences in trainings.10x5 m value results obtained in this study appears to be rather higher than the results of other studies. Speed is important in rhythmic gymnastics not only in terms of execution of technical structure, but also in terms of increase of speed in sequential movements .In the study long jump distance results of the study seem to be consistent with the literature. In the study, bent arm hang value is found as 3,17±3,51.Gymnastics necessitates athletes to move their body from someplace to another one most of the time. Therefore, arm strength and arm's function to move the body is important. However, results of our study, seem to be very low compared to other results in the literature. Balance is the ability to perform the desired position of the body during the movement. In the study, plate tapping speed is found as 10,11±2,40sec.Examined the relations between physical fitness parameters of girls at the age of 7 and negative correlation is found statistically significant between balance and standing long jump values. References: Đorđević, M, Pantelić, S, Kostić R, Uzunović S. (2014). Correlation Between Anthropometric Characteristics and Motor Abilities in 7-YearOld Girls. Physical Education and Sport, 3, 251-260.

THE RELATIONSHIP BETWEEN VELOCITY AND POWER PARAMETERS DURING LOADED-SQUAT JUMP EXERCISE WITH SPRINT AND JUMP PERFORMANCES.

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Introduction: Power is mechanical quantity that expressed as the time-wise rate of a doing action and generally depends on the ability to produce maximal force as possible as (Stone et al., 2003). Velocity which is known as a vectorel quantity is the timewise ratio of change in positions and is one of the parameters that is used for digitizing the volume of exercise in resistance training (Gonzales-Badillo and Sanchez-Medina, 2010). Methods: A total of 13 athletes competing in martial sports have participated in this study voluntarily. Sprint (10, 20 and 30 meter), vertical jump (VJ), standing long jump (SLJ), one repetition maximal (1RMSQ) and loaded-squat jump (SJLoaded) tests were performed. Descriptive statistics and spearman correlation analysis were used for data assessment. Results: There is no statistically significant relation between 10, 20 and 30 meter sprint times with the MPV (r= - ,332; r= -,375; r= -,446), PV (r= -,058; r= -,118; r= -,165), MPP (r= -,285; r= -,482; r= -,485) and PP (r= -,205; r= -,512; r= -,391) values during SJLoaded exercise (p>.05). In addition, while no statistically significant relation has been obtained between the VJ and SLJ values of the participants and MPV (r= ,496; r= ,429) and PV (r= ,300; r= ,223) values during SJLoaded exercise (p>.05), it has been ascertained that there is a statistically positive and significant relation between MPP (r= ,620; r= ,580) and PP (r= ,678; r=,572) values (p<.05). Discussion: It is observed in literature that the relation between power and velocity values reached in concentric phase of full or half squat movement with sprint and jump performances (Lopez-Segovia et al., 2009; Can et al., 2014) or the relation between velocity parameters in countermovement jumping movement and short sprint performance (Marques et al., 2011) has been researched. However there is no study examining the relation between sprint and jumping performance with velocity and power parameters during loaded-squat jump movement. Therefore, it is thought that the results obtained are important for the literature of sports sciences and they will be a reference source for future studies. References: Can, İ. (2004), "The Relationship with Sprint and Jump Performances of Kinetics - Kinematics in the Propulsive Phase of Full Squat Movement'', Karadeniz Technical University, Institute of Educational Sciences (Doctoral Thesis), Trabzon, 2014. Gonzales-Badillo, JJ., Sanchez-Medina, L. (2010), "Movement Velocity as a Measure of Loading Intensity in Resistance

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THE INFLUENCE OF DANCE TRAINING ON YOUNG DANCERS' MOTOR COORDINATION.

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Introduction: The purpose of this study was to examine influence of dance training on young girls' motor coordination (MC) depending on their dance career. Method: A total of 83 girls aged 7 to 11 years were divided into three groups (beginners, recreational dancers, competitors) and were measured for MC using Körperkoordinationstest für Kinder (KTK). All girls performed four subtests (tasks): walking backwards (WB), moving sideways (MS), hopping for height (HH) and jumping sideways (JS). Administration and scoring of the KTK test was performed according to the manual (Kiphard & Schilling, 2007): the raw score for each subtest was transformed into gender, and age specific motor quotients (MQ) values, which were based on the performance of 1228 normally-developing German children in 1974. Multivariate analysis of variance (MANOVA) was applied to determine the quantitative differences between variables system of the three divided groups, whereas for determining the differences between each four KTK subtests of three divided groups, univariate analysis of variance (ANOVA) was applied. Results: The results of the research show a significant difference in the whole system of variables and in the harshest level of statistical inference of P=0.00 between beginners, recreational dancers and competitors groups. By analyzing every variable separately, significant statistical differences have been noticed in all variables except the variable WB, where there was no considerable statistical difference noticed between the recreational dancers and competitors group. Discussion: Based on the results of this research, the authors came to the conclusion that the motor coordination of girls who are engaged in modern dance for a longer period of time is much more and better developed and therefore, that the dance is positively impacting transformation of the motor coordination of young girls. Kiphard, E.J., and Schilling F. (1974). Körperkoordinationstest für Kinder. Beltz Test, Weinham. Kiphard, E.J., and Schilling, F. (2007). Körperkoordinationstest für Kinder 2, überarbeitete und ergänzte Aufgabe. Beltz test, Weinham. D'Hondt, E., Deforche, B., Gentier, I., De Bourdeaudhuij, I., Vaeyens, R., Philippaerts, R., & Lenoir, M. (2013). A longitudinal analysis of gross motor coordination in overweight and obese children versus normal-weight peers. International Journal of Obesity, 37(1), 61-67. doi:10.1038/ijo.2012.55.

IMPROVING POSTURAL STABILITY WITH DYNAMIC NEUROMUSCULAR STABILIZATION IN BASKETBALL.

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Introduction: Dynamic Neuromuscular Stabilization (DNS) is program and training strategy based on the principles of developmental kinesiology and neurophysiological aspects of the maturing postural

locomotor system (Kobesova, 2012). A key premise of the DNS approach is that every joint position depends on stabilizing muscle function and coordination of both the local and distant muscles in order to ensure neutral or cantered position of all joints in the kinetic chain (Frank, 2013). The quality of this coordination is crucial for joint function and influences on basketball performance. The aim of this research was to determine the short-term effects of DNS on postural stability in young basketball players. Methods: Sixty basketball players between the ages of 15 and 17 years were allocated to either the control group (standard pre-season regimen) (CG; n = 30) or the experimental group (DNS; n = 30), which received DNS training session for core stability in period of 10 days (2 training session per day). The following stability parameters were used in the research: Range centre of force X; Range centre of force Y; Force; Area of sway; Sway distance; Speed of sway. A two-way repeated measure ANOVA (2 × 2) was used to test for interactions and main effects for time (initial vs. final) and group (CG vs. DNS) on postural stability parameters. Results: Compared with the initial testing, there was a significant ($p<0.05$) improvement in all postural stability tests. After experimental period DNS group improve significantly all core and postural stability abilities within DNS training during pre-season preparation. Discussion: The present study investigated the effects of a DNS training program on postural stability in short-term. The primary finding of this study was that participation in a DNS training program produced greater improvement in postural stability than traditional core exercise in young basketball players after 10 days of training. These results demonstrate that specific core training, as part of the overall pre session training process, can be considered a useful tool for the improvement of postural stability. Several studies involving athletes (McLeod, 2009; Myer, 2006) have noted significant improvements stability parameters. A novel finding from the present investigation was that 30 min of DNS training performed twice per day resulted in significantly greater gains in core stability measures than normally achieved with standard core strength training program in short-term. Findings from the present investigation indicate that DNS instructed by qualified professionals can result in significant improvements in core stability in basketball. References: Myer GD, Ford KR, Brent JL, Hewett TE (2006). J Strength Condit Res, 20(2), 345-353. McLeod TC, Armstrong T, Miller M, Sauers JL (2009). J Sport Rehabil, 18(4), 465-481. Frank C, Kobesova A, Kolar P (2013). Int J Sports Phys Ther, 8(1), 62-73. Kobesova A, Osborne N (2012). IMM, 34(2), 39-41.

EFFECT OF AGE ON KINAESTHESIA.

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Introduction: The structural and morphological changes of somatosensory receptors, vision, vestibular system, central and peripheral nerve system and the musculoskeletal system connected with ageing have a negative impact on kinaesthesia. The purpose of this study was to investigate whether there are differences in kinaesthesia of the elderly and that of the young adults by taking into consideration different aspects of kinaesthetic perception. Methods: 23 young adults and 23 older adults participated. They were all submitted to measurements of sense of touch, two-point discrimination, threshold of pain, knee and torso position sense, dynamic reposition of knee, force reproduction, force matching, balance in the sitting and standing position. All subjects were also tested on the ability of their sense of verticality. In addition, the subjects also filled out a questionnaire on their overall physical activity as well as a medical status questionnaire. T-test and Mann Whitney test were used to establish the differences between the groups, while Pearson and Spearman rank correlation coefficient were used to test the relationships between different kinaesthetic

aspects and the amount of physical activity subjects do. Results: In comparison with young adults, elderly people differentiate in knee position sense in extension, the knee dynamic reposition, the force matching in the knee joint and in the majority of the parameters of static balancing. Both groups have no differences in terms of two-point discrimination sesnse, threshold of pain, knee position sense and sense of verticality. The ability of force matching and the knee joint position are typically linked to some balance parameters. The amount of sitting has an important negative influence on balance in both age groups. Discussion: The groups differentiate significantly in some aspects of kinaesthesia. These findings were consistent with the previous evidence considering knee position sense (Kaplan et al, 1985; Hurley et al,. 1998; Petrella et al., 1997; Ribeiro in Oliveira, 2010) and static balance (Sturnieks et al., 2008; Winter, 1995). Major differences were observed in more demanding tasks, which, apart from kinaesthetic perception, also include cognitive functions. References: Hurley, M.V. et al. (1998). Age ageing, 27(1), 55–62. Kaplan, F.S. et al. (1985).Acta Orthop Scand, 56(1), 72–74. Petrella, R.J. et al. (1997). Am J Phys Med Rehabil, 76(3), 235−241. Ribeiro, F., Oliveira, J. (2010). Arch Gerontol Geriatr, 51(1), 64−67. Sturnieks, D.L. et al. (2008). Neurophysiol Clin, letn. 38(6), 467–478. Winter, D.A. (1995). Gait & Posture, letn. 3(4), 193−214.

Poster Presentations

Anthropology

ESTIMATION OF STATURE FROM ARM SPAN IN ALBANIAN POPULATION.

Bjelica, D.[1], **Masanovic, B.**[1], **Jarani, J.**[2], **Popovic, S.**[1]
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Introduction: The purpose of this research is to examine body height in both Albanian sexes as well as its association with arm span, as an alternative to estimating body height. Methods: A total of 445 individuals (266 boys and 179 girls) participated in this research. The anthropometric measurements were taken according to the protocol of ISAK. The relationships between stature and arm span were determined using simple correlation coefficients at a 95% confidence interval. Then a linear regression analysis was carried out to examine extent to which arm span can reliably predict body height. Results: Results displayed that Albanian boys are 176.57±7.36cm tall and have an arm span of 179.98±9.41cm, while Albanian girls are 166.84±9.28cm tall and have an arm span of 167.53±10.34cm. Discussion: The results have shown that both sexes made Albanians a tall nation but not even close to their male compatriots from Kosovo that are almost 3 centimetres taller, while the results in female population are opposite. Moreover, the arm span reliably predicts stature in both sexes, which confirms a high R-square (%) for the boys (73.4) as well as for the girls (78.8). References: Popovic S (2017). Monten. J. Sports Sci. Med., 6(1), 81-87. Popovic S, Bjelica D, Doina-Tanase G, Milasinovic R (2015). Monten. J. Sports Sci. Med., 4(1), 29-36.

EFFECTS OF PROGRAMMED PHYSICAL EDUCATION ON TRANSFORMATION OF MORPHOLOGICAL CHARACTERISTICS AND COMPOSITE STRUCTURE OF THE BODY OF CHILDREN WITH DISABILITIES.

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Introduction: Children with disabilities require special forms of care and protection during their growing, development, socialization and social inclusion. Population of pupils with disabilities represents one of the links in the chain of complex educational and systematic social impact in physical and health education of new generation. Method: Research has been conducted among the students of Los Rosales Centre for children and youth with disabilities. The sample consisted of boys and girls, total 92 subjects, with moderate and mild levels of retardation, of school age V – VII grade, divided into two sub-samples per gender. Morphological space is evaluated with 9 variables, while the composite structure of body is evaluated by Tanita scales with 9 parameters. Results and Discussion: Analysis of the research results evidently shows that applied physical education and sports program causes quantitative partial effects of changes in regard to the relation between results of initial and final measurements in the research sample of male and female students with disabilities during one school year (September – June). Practical

importance of this study is in possibility to gather significant information that can largely improve teaching plan and program for children with disabilities in primary schools. References: None.

COMPARATIVE STUDY OF ANTHROPOMETRIC MEASUREMENT AND BODY COMPOSITION BETWEEN JUNIOR SOCCER AND VOLLEYBALL PLAYERS FROM NATIONAL LEAGUE.

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Introduction: The purpose of this study was to describe anthropometric characteristics and body composition of junior soccer and volleyball players from national league as well as to make comparisons between them. Method: Seventy-one males were enrolled in the study, divided into three groups: twenty-five soccer players, fourteen volleyball players and thirty-two healthy sedentary subjects. All subjects were assessed for the anthropometric measures required for the calculation of body composition variables, using the standardized procedures recommended by established literature. Data was analysed using SPSS and the descriptive statistics were expressed as a mean (SD) for each variable, while the ANOVA and LSD Post Hoc tests were carried out to detect the effects of each type of sport. Results and discussion: The results showed that a significant difference was found for body height, body weight, and contents of body fat. Significant difference was not found in the remaining three variables, body mass index, muscle contents of body and bone contents of body. Volleyball players were significantly taller and heavier than soccer players and the subjects of the control group, while there was not have significant difference between the body height and body weight of soccer players and the subjects of the control group. Subjects of the control group have significantly more percentages fat content in the body than soccer and volleyball. Soccer players had the lowest percent of the fat content, while the subjects of the control group had the highest. Conclusion: Therefore, these findings may give coaches from the region better working knowledge and suggest to them to follow recent selection process methods and to be more careful during the recruitment. References: Popovic S, Akpinar S, Jaksic D, Matic R, Bjelica D. (2013). International Journal of Morphology, 31(2), 461-467. Popovic S, Bjelica D, Jaksic D, Hadzic R. (2014). International Journal of Morphology, 32(1), 267-274.

Biomechanics

THE IMAPCT OF THE HAND SURFACE AREA AND STROKE FREQUENCY ON THE SWIMMING SPEED.

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Introduction: Swimming is monostructural sport where arms generate most of energy needed to move. Swimming technique is important factor in every level of swimmers (Barbosa et al., 2011). Stroke frequency affects swimming speed and swimming technique. Swimming frequency is defined as the number of full stroke cycles performed within a unit of time. The biggest propulsive part of the arm is hand. Different hand size could cause various swimming speed. Methods: A transversal research was carried out on 15 male swimmers, aged 10-12. Research was held in Subotica 25m long, swimming pool, in swimming camp organized by Swimming federation of Vojvodina. Swimmers was swimming 50m free style as fast as possible, swimming time was measured, stroke rate was counted while they were

swimming. Using stroke rate it is possible to calculate stroke frequency. Criteria on this research was 50m free style – (S50) and predictor variables were: total hand surface area (THSA) and stroke frequency (SF). Results: Regression analysis showed that total hand surface area (THSA) significantly correlate with 50m free style for this sample. Discussion: According to results of this research, it is easy to conclude that swimming speed on 50m free style on this sample, depends of their hand surface area. To remind, swimmers use paddles because of their bigger surface area than hand surface area, which demand more strength for paddle. Swimming training, with swimming paddles are present when conditioning is training aim. Toussaint et al. (1991) find that the strokes with swimming paddles are more efficient (7.8%) than the strokes without paddles. The bigger hand surface area, the faster swimming is. In swimming selection it is important to find children also with bigger hand surface area. References: Barbosa, T. M., Marinho, D. A., Costa, M. J., & Silva, A. J. (2011). Biomechanics of competitive swimming strokes (pp. 367-388). Toussaint, H.M., Janssen, T., & Kluft M. (1991). Effect of propelling surface size on the mechanics and energetics of front crawl swimming. J Biomechanics, 24, 34, 205-211.

Coaching

PLYOMETRIC TRAINING IMPROVES PERFORMANCE ACROBATIC ELEMENTS AND VAULT TO GYMNASTS.

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Introduction: The physical preparation represents a determined structural side of the sport training inside gymnastics and an important content factor conditioning the technical level and the performance capacity. Plyometric training structured by scientific standards reveals to be an efficient method to develop and improve the performance. The maximal strength of a muscular contraction is the decisive factor in doing the performing exercises and fastest moves. A fast gymnast moves, quickly, explosively and coordinated so as compared with others.(Meta A., 2001) Methods: The experiment consisted of application of individualized training programs for each component based plyometric exercises carried out at a frequency of 2 lessons for week, regardless of period or phase of education. (Bompa, T., Di Pasquale, M., Cornacchia, L., 2003) The testing was effectuated by 3 trials:-- High jumps from standing;-- Long jump in one feet support 3 steps with left and other right.-- A long jump followed by immediate take-off (Weineck, J., 2003). Results: The resulted data was statistically put together: For the testing of the high jump from standing a significant difference is seen between the initial and final test at the significance level of $p<0,001$;For the long jump in one feet support a significance difference is noticed between the initial and final test at the level of $p<0,05$;For the long jump followed by vertical take-off one observes an important difference between the two test at the significance level of $p<0,02$. Discussion: Plyometric trainingplanned for a period of 4 months helps to develop the motor ability, a necessary quality in increasing the sport performance. Applying programmes of muscular training inside the preparation has contributed to improving the level of the technical. In this case that the training required for development rapid force (plyometric) is always in the exercise of specific requirements (Jorgoni, 2005) our case on the floor and vault. References: Meta, A.,(2001)"Methodology motor preparation of young gymnasts", Monograph. 15-19.Bompa, T., Di Pasquale, M., Cornacchia, L., (2003), "Serious StrengthTraining", Human Kinetics, secondedition, Champaign, IL–USA,71,134-138. Weineck, J.,(2003) "Manuel d'entrainement", Editions Vigot, 4 eme edition,Paris,87-102.Jorgoni A.(2005) "Theory and methodology of sports exercise", Vol. 2, 70-73.

ANAEROBIC AND AEROBIC EXERCISES ON OVERWEIGHT CHILDREN.

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Introduction: Overweight among children, adolescents has emerged as one of the most serious public health concerns in the 21st century. The worldwide prevalence of childhood overweight has increased remarkably over the past 3 decades. Overweight and obesity increases chances of developing medical problems that can affect their present and future health. These include serious conditions like type 2 diabetes, high blood pressure, and high cholesterol — all once considered adult diseases. (Pagano R., La Vecchia C., 2005) Overweight and obese children are also at risk for: bone and joint problems; shortness of breath that makes exercise, sports, or any physical activity more difficult and may make asthma symptoms; restless sleep or breathing problems at night. The best person to determine whether or not your child is overweight is your child's teacher PHE. In determining whether or not your child is overweight, the teacher PHE will measure your child's weight and height and compute his ''BMI,'' or body mass index, to compare this value to standard values. (Gaxho I. 2002). Methods: The sample consisted of 38 overweight children ranging in ages 14-16 years. They were divided randomly into two groups; one group participated to a program (6 months) of aerobic exercises and the other group participated to a program of anaerobic exercises. Initial and final determinations were compared and analyzed – anthropometric and cardiorespiratory data. (Dashi T., Dashi E. 2007). Results: Results indicated that both types of exercises have a great influence in the physical evolution of an overweight adolescent; some differences were observed between the two groups on the final measurements so we can say that, the two types of effort act differently on the studied parameters. Discussion: Proposing a mixture of physical exercises, balanced diet, rest and hygiene as a preventive therapy, we are giving the adolescents the skills to carry on a more healthy living and a way to improve their health and quality of life (Pesa, 1999). References: Pagano R., La Vecchia C., (2005),"Overweight and obesity in Italy 2003" International Journal of obesity; 18; 65-69. Gaxho I. (2002). "Physical education out school". Curriculum and schools. I.S.P. Tirana (2); 103-116. Dashi T., Dashi E. (2007). "Physical education in schools ". Tirana. 155-156. Pesa J. (1999). "Psychosocial factors associated with dieting behaviors among male and female adolescents". Journal of School Health. 196-201

Health and Fitness

DESCRIBING PHYSICAL ACTIVITY PROFILE OF OLDER MONTENEGRIN FEMALES USING THE INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE (IPAQ).

Popovic, S.[1], **Bjelica, D.**[1], **Vukotic, M.**[1], **Masanovic, B.**[1]
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Introduction: The goal of this study was to describe the physical activity profile of older females living in Montenegro. Methods: The data was collected from 482 randomly selected older Montenegrin females, aged between 50 and 97 years of age. The International Physical Activity Questionnaire (IPAQ), self-administered long format, was used to describe the physical activity profile of selected population in five areas (job-related physical activity, transportation physical activity, housework, house maintenance, and caring for family, recreation, sport, and leisure-time physical activity and time spent sitting). A descriptive analysis was carried out to analyse the mentioned variables. Results: Among variety of very interesting

results reached by the mentioned protocol, it is important to highlight that just 31.3% of respondents currently have a job or do any unpaid work outside its home, 56.2% of them walked for at least 10 minutes at a time to go from place to place, but one third not more than twice during the last seven days. On the other hand, 79.9% of respondents did physical activities related to housework, house maintenance, and caring for family at least 10 minutes at a time, but one third not less than seven days a week. 48.5% of Montenegrin female did not walk at least one day for at least 10 minutes at a time in its leisure time, but over 50% of active women did walk more than three out of seven days in the week. Over 50% of respondents have usually spend sitting more than four hours on a weekday. Discussion: The data reached in this project suggested that the prevalence of physical inactivity among older Montenegrin females was relatively high and physical inactivity increased by the age. From this reason, the physical activity promotion has to be more implemented in the nation projects for the older female people in Montenegro. This abstract has been done within nation project under the title "Effects of Physical Activity on Social Inclusion of Older People" that was approved by Ministry of Science in Montenegro (No.01- 2587 from 11 December 2017). References: Fogelholm M et al (2006). International Physical Activity Questionnaire: Validity against fitness. Med Sci Sports Exerc, 38, 753-760. Kolbe-Alexander TL, Lambert EV, Harkins JB, Ekelund U (2006). J Aging Phys Act, 14, 98-114.

DESCRIBING PHYSICAL ACTIVITY PROFILE OF OLDER MONTENEGRIN MALES USING THE INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE (IPAQ).

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Introduction: The goal of this study was to describe the physical activity profile of older males living in Montenegro. Methods: The data was collected from 833 randomly selected older Montenegrin males, aged between 50 and 71 years of age. The International Physical Activity Questionnaire (IPAQ), self-administered long format, was used to describe the physical activity profile of selected population in five areas (job-related physical activity, transportation physical activity, housework, house maintenance, and caring for family, recreation, sport, and leisure-time physical activity and time spent sitting). A descriptive analysis was carried out to analyze the mentioned variables. Results: Among variety of very interesting results reached by the mentioned protocol, it is important to highlight that 50.3% of respondents currently have a job or do any unpaid work outside its home, 77.6% of them walked for at least 10 minutes at a time to go from place to place, but one third not more than twice during the last seven days. On the other hand, Just 39.9% of respondents did physical activities related to housework, house maintenance, and caring for family at least 10 minutes at a time, but one fourth not more than two days a week. 25.7% of Montenegrin males did not walk at least one day for at least 10 minutes at a time in its leisure time, but over 47.3% of active men did walk more than four out of seven days in the week. Over 45.5% of respondents have usually spend sitting more than four hours on a weekday. Discussion: The data reached in this project suggested that the prevalence of physical inactivity among older Montenegrin males was relatively high and physical inactivity increased by the age. From this reason, the physical activity promotion has to be more implemented in the nation projects for the older male people in Montenegro. Funding: This abstract has been done within nation project under the title "Effects of Physical Activity on Social Inclusion of Older People" that was approved by Ministry of Science in Montenegro (No.01- 2587 from 11 December 2017). References: Fogelholm M et al (2006). International Physical Activity Questionnaire: Validity against fitness. Med Sci Sports Exerc, 38, 753-760. Kolbe-Alexander TL, Lambert EV, Harkins JB, Ekelund U (2006). J Aging Phys Act, 14, 98-114.

A CROSS-SECTION STUDY OF TRAINERS (INSTRUCTORS) ON FITNESS CENTERS IN ALBANIA.

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Introduction: Fitness has a very important impact in well-being of everyone who is dealing with. Anyway in our country, we have no much evidence about the right number of instructors who are engaged at this activity. Methods: Right for these, is undertaken a study including 120 fitness centers random selected all over the country. Was edited a questionnaire aimed to find the right number of fitness instructors related with the total number of gym centers. Results: The data given by this study are showing that 43% of fitness centers have employed only 1(one) instructor; 33% have employed 2(two) instructors; 13.5%, have employed 3(three) instructors; and only one fitness center have employed 5(five) instructors. The results are clearly shown that greater part of our centers (about 76.6%) are employing no more than 2(two) instructors. Discussion: We would like to insist the need of further future investigations defining the right number of fitness instructors in relation even with activity space our fitness centers have. References: American College of Sports Medicine (2007). ACSM's Health/Fitness Facility Standards and Guidelines (3rd ed.). Champaign, Ill.: Human Kinetics. Janot, J. (2004). Do you know your scope of practice? IDEA Fitness Journal, 1, 1, 44–45.

A STUDY ABOUT PARTICIPATION IN FITNESS CENTERS IN TIRANA.

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Introduction: Fitness is a very important part for people in order to have a healthy lifestyle. Exercising regularly leads to a healthy lifestyle and furthermore to an active population. Methodology: For these reasons, a study was made in the city of Tirana, respectively in 61 fitness centers that were randomly selected. In these fitness centers a questionnaire was done with the manager, in order to find out the number of people that frequent them, comparing female and male participation and the time of the year that it was mostly frequented. Result: The results showed that the total number of client in these 61 fitness centers was 30203. 5% of the fitness centers were more frequented by men, 10% by women and 85% were equally frequented by man and women. Regarding the attendance based on the time of the year it resulted that: From January to April the number of clients was 12406, from May to August it was 8084 and from September to December the number was 8475. Conclusions: Analyzing the overhead results these conclusions are reached. In general, people show a considerable interest in frequenting fitness centers. Different from stereotypes, female are as interested as man in frequenting fitness centers. Fitness centers are mostly frequented from January to April, which means before vacations, meaning that the main reason that people frequent fitness centers is aesthetic, but even the other part of the year has a high frequency. References: American College of Sports Medicine & American Heart Association (2007). Physical Activity and Public Health Guidelines. www.americanheart.org/ presenter.jhtml?identifier=3049282. U.S. Department of Health & Human Services (1996). Physical Activity and Health: A Report of the Surgeon General. Atlanta, Georgia: U.S. Department of Health & Human Services, Public Health Service, CDC, National Center for Chronic Disease Prevention and Health Promotion.

SCOLIOSIS AND ITS PREVALENCE IN CHILDREN.

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Introduction: The incidents of poor posture have dramatically increased especially in these last two decades in school age children (Latalski et al, 2013). These incidents are mostly consequences of sedentary daily life style modifying their posture shape. Because of that, postural deviations become one of the most studied issues by many scientific researchers (Brianezi et al, 2011). Several of researchers show that "Scoliosis" is one of the most frequent incorrect postural shapes detected in school age children (Bueno & Rech, 2013). Aim: This is the reason why our study aims to evaluate the prevalence of "Scoliosis" in Albanian children. Methodology: In our study participated 308 children aged 10-13 years (n = 151 girls, n = 157 boys) who were randomly selected from public schools of Tirane. This sample participated at Postural Shape Examination (Anterior View) using Posture Screen Mobile®-PSM (iPod) and Postural Analysis Grid Chart. Children were photographed at the Anterior View (Upright Standing Position) and they were wearing as less as possible in order to provide detailed data that describe their postural shape. For the statistical analyze of data we applied "IBM SPSS Statistics 20" using different analytical techniques such as Descriptive & Frequency Analyze. Results: Our results showed that 34 subjects or 11.03% of children were detected with Scoliosis. This incorrect posture resulted more common at 13 years old children (19.5%) compare to 10, 11 or 12 years old. While the gender that resulted more affected by scoliosis was boys (12.7%) compare to girls (9.3%). Results show a slight difference between the degrees of postural displacement of boys (5.81850) compare to girls (5.43610). In addition to that postural displacement is recorded to be higher in boys of 13 years old (7.76500) and in girls of 12 years old (6.14580). Conclusions and Recommendations: Even why our results didn't show a high prevalence level of scoliosis, it is important to emphasize that this incorrect posture exists in our children's life. Based on these conclusions we recommend that parents, teachers, and children should be aware about the importance of good posture and the problems that a long term effect of incorrect posture might cause in human wellbeing. References: Latalski M, Bylina J, Fatyga M, Repko M, Filipovic M, Jarosz M.J, Borowicz KB, Matuszewski L, Trzpis T (2013). Risk factors of postural defects in children at school age. Annals of Agricultural and Environmental Medicine. Vol. 20, No 3, Pg. 583–587. Brianezi L, Cajazeiro DC, Maifrino LBM (2011). Prevalence of postural deviations in the school of education and professional practice of physical education. Journal of Morphol.Sci.Vol.28, No.1, Pg.35-36. Bueno RC, Rech RR (2013). Postural deviations of students in Southern Brazil.Rev Paul Pediatric. 31(2):237-42.

A CROSS SECTION STUDY ON OPENING PERIODS OF FITNESS CENTERS IN ALBANIA.

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Introduction: There is a lack of information about the period that the fitness center were opened in Albania. For this reason there was conducted a study research to compare the years of the opening of the fitness centers in Albania. Methodology: A questionnaire were conducted in Albania in 117 fitness center in the cities that were randomly selected. Result: Results from the 117 fitness centers show that: year 2012 was the best period of the openings of the fitness centers (N= 24), year 2010 the openings of the fitness centers (N= 12) and year 2007 the openings of the fitness centers (N= 10). The year 1999

was the lowest with the opening of the fitness center (N=1) and also year 2001 with the opening fitness center (N=2). Conclusions: The results from this study show that there was an increase of the opening of fitness center from year 1999. References: American College of Sports Medicine (2007). ACSM's Health/Fitness Facility Standards and Guidelines (3rd ed.). Champaign, Ill.: Human Kinetics. Janot, J. (2004). Do you know your scope of practice? IDEA Fitness Journal, 1, 1, 44–45.

Nutrition

MUSSELS FOR AN ACTIVE MEDITERRANEAN LIFESTYLE.

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Introduction: Shellfish from marine aquaculture are rich in micronutrients like minerals, vitamins and essential amino acids and fatty acids (Bongiorno et al., 2015) Although the Mediterranean diet includes these food sources, regular consumption by the general public within the Mediterranean sea basin varies. It is hypothesized that regular consumption of these micronutrient-rich foods in combination with regular physical activity, both components of the Mediterranean lifestyle, will induce beneficial effects by enhancing the bioavailability of these micronutrients to the human organism, and thus potentially contribute to a healthier life. The Science and Research Centre, Koper Slovenia in collaboration with the Public agency for Promotion of Entrepreneurship and Developing Projects of Municipality of Izola and with support of the Slovenian Ministry of Health are developing a project covering the European Union macroregions, and will raise attention for the facts that mussels from aquacultures are an affordable micro-nutrient-rich food source. Its goals are (1) to valorise mussels as a healthy, safe, nutritious and affordable part of an active Mediterranean diet supported by nutritional and environmental diagnostics; (2) to promote a sustainable mussels aquaculture production; and (3) to demonstrate by diagnostics and research that the regular consumption of mussels induces health benefits. Methods: To reach these ambitious goals six work packages are developed: WP1: Assessment among population of: mussels consumption (general seafood consumption) in combination with level of Mediterranean Lifestyle and amount of physical activity; WP2: Innovation in mussels aquaculture; WP3:Nutritional content of mussels; WP4: Environmental health status of mussels; WP5: Athletes training camp with mussels-rich diet and assessment of induction of health effects and improved performance; WP6: General dissemination and promotion of mussels consumption. Results: In collaboration with Slovene organisations the initial preparations are being executed: the writing of proposals that can be submitted to the appropriate funding sources, relevant data collection within the mussels aquacultures, strategy development regarding innovation and research. Discussion: In order to develop the project further, and prepare successful proposals, the organisations involved are currently identifying stakeholders throughout the Mediterranean basin, ranging from marine aquaculture entrepreneurs to public health institutes, and from research organisations (kinesiology and environmental) to marketing offices, focusses on activities within the above described work packages related to marine aquaculture of shellfish. References: Bongiorno T, Iacumin L, Tubaro F, Marcuzzo E, Sensidoni A, Tulli F (2015). Food Chem 173, 355-362.

Other

CONNECTION OF FUNCTIONAL MOTOR SKILLS WITH THE PROCESS OF ADOPTION OF BASIC SKIING TECHNIQUES.

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Introduction: Success in Alpine disciplines depends primarily on the level of specific motor knowledge acquired, but also on the level of motor and functional abilities (Franko, 2007). The main goal of the research was the identification of statistically significant influence of functional and motor skills on the level of mastering of basic ski technique, parallel scaling with students of the Faculty of Sport and Physical Education. Method: The testing was conducted on a sample of 35 respondents, students of the second year at the Faculty of Sports and Physical Education in Niksic, which are included in the regular course in the Basics of Skiing course. The predictor system of variables represented 10 functional-motor tests: a Harvard step-test, a flamingo test, a handwriting, an incline with sitting in the seat, a jump from the place, a dynamometer of the hand, a lying-seat for 30 seconds, a support in the hinge, a running run 10x5 , a persistent crazy running. The criterion system of variables was a test for the assessment of the situational motor problem, parallel wiring. A multiple regression analysis was used to determine the impact of the system of predictor variables on the criterion. Results: Based on the results, the regression analysis of the criterion variable parallel wiring in the predictor system 10 of functional-motor variables, it can be concluded that there is statistically significant influence of the predictor system on the criterion variable. The efficiency of the ski technique, parallel wiggle, showed the greatest significance of regression, with the influence of three variables of motor skills, such as: tapping with the hand, preclination with seat occupancy and support in the hinge. Discussion: According to the obtained results of the realized research, we can conclude that motor skills are a significant predictor for the adoption of basic ski technique parallel winding with the skipper skiers, in this case, students of the Faculty of Sport and Physical Education. The results of this research can be directed towards innovating plans and work programs, and adapting to the same needs of the particular population through the direct application of results that have come into practice. References: Franjko, I. (2007). Faktori uspješnosti izvedbe skijaških elemenata. Magistarski rad. Kineziološki fakultet Sveučilišta u Zagrebu.

Physical Education and Pedagogics

(NON) CHANGEABILITY OF ATTITUDES TOWARDS THE SUBJECTS „SPORT FOR ATHLETES“ WITH REGARDS TO THE TIME OF ATTENDING THE COURSE.

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Introduction: Physical education, as a compulsory subject and a very important part of education, has the opportunity to offer pupils certain contents as elective subjects. This is the fulfilment of the long-standing desire of many authorities in the field of physical education and all those who have fought a lot for the position of physical education in educational field of study (Ljubojević, 2011).These can be sports (sports games - one sport game - one elective subject), dance, folklore games, chess (Institute of

Education, 2005).From students' interest, i.e. the number of groups depends on whether and how many groups will be formed for the proposed elective course. Method: The aim of this study was to determine the (non)changeability of pupils' attitudes towards the subject "Sport for athletes" with regard to the time of attending the course. The research was carried out in two elementary schools, with pupils of ninth, final grade in elementary school, aged 14 years. The sample included 218 pupils, of which 113 boys and 105 girls divided into five groups: a Control group who did not attend classes Sport for athletes 19% and groups that have opted for Basketball 23%, Football 20%, Handball 19% and Volleyball 19%. Independent variables in this research were group membership, gender, general success, and whether a student would like to be engaged in some sport. Dependent variables were a list of reasons why the student is not involved in sports, who was electing the course and how satisfied he/she is, a list of reasons why they did not select for the „Sport for athletes". Results and discussion: Male pupils are more interested in introducing handball, tennis and water polo, while female pupils are interested in volleyball, basketball and swimming. The students were eager to get the sport which they had chosen at the „Sport for athletes". The pupils with good success support the introduction of tennis, and excellent pupils for basketball and volleyball, pupils with very good success are almost equally interested in all sports games offered by the „Sport for athletes". Pupils who are for introduction of „Sport for athletes" have chosen basketball as the obligatory sport. The pupils, who did not chose „Sport for athletes" as the most important reasons specify that they are not interested in sports and that they did not find offered sports interesting, unlike other subject, 5.5% think that they are not talented enough for sports. The results showed that there is a slight decrease in students' satisfaction with Sport for athletes in accordance with age. Students who are very satisfied with the choice of elective sports in both classes mostly want the Sport for athletes to become a compulsory subject. The results of the research can be a good basis for evaluating the effects of the reformed education, or more precisely, the introduction of the Sport for athletes in the third cycle of elementary education. References: None.

A STUDY ON THE PHILOSOPHICAL PROFILE OF PHYSICAL EDUCATION TEACHERS IN ALBANIA.

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Introduction: We know that the main aim of the philosophy of education is to teach educational practitioners to reflect upon why they act and do things, on their behaviors (Reboul, 1971). But teachers are mainly interested in learning what they do because for many of them the practice of teaching is reduced to action devoid of a rationale or justification. Methodology: This study involved 68 PE teachers in Albania. On the basis of this hermeneutical interpretation aimed at identifying this five main educational philosophical profiles of contemporary PE teachers, we have a questionnaire of 50 items (10 items x 5 profiles). This research tool, based on a Likert scale, centered on a score system from 1 to 5, is aimed to detect the level of agreement or disagreement of PE teachers with reference to the items contained in the questionnaire. Results: The result of this demographic study show us the big prevalence difference between idealist profile at urban PE teachers that has much more valid percent than in rural PE teachers but in the same time it show us that rural idealist and socio-critical have the same results. Conclusions: Urban teachers show a higher result relating to idealist profile. To better explain this result, we could form the hypothesis that urban PE teachers as educational practitioners are more sensible to ideal values of physical education and sport; in any case, this hypothesis needs to be better verified and analyzed by future researches

based on a wider sample. References: Davis, E. C. (1963) (Ed.) Philosophies fashion physical education; pragmatism, idealism, realism, aritomism, existentialism. Dubuque, Iowa: W. C. Brown. Reboul, O. (1971). La philosophie de l'éducation. Paris: PUF.

YOUTH AND SPORT IN MONTENEGRO.

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Introduction: In this paper, we explore how much sport is developed among young people in Montenegro and what should be done to improve and develop physical culture in the younger and lesser school systems. This would affect the proper development of young people and create opportunities for choosing potential talents for certain sports disciplines, which would later be created by top athletes and members of national teams. Methods: For the purposes of this paper, we conducted an interview with sports experts who examined the current situation in the field of sports among young people in Montenegro. They have made recommendations on what should be done in order to achieve a better development of sports among young people. The responses from the interview were analyzed by encoding by selecting bitwise and removing insufficiently significant codes, i.e. characteristics for this topic, and then individually and together analyzed. Results: Respondents agree that school and mass sports are not sufficiently developed in Montenegro, which reduces the ability to stimulate talents. They propose how to improve the state of sports in children and young people. These measures are better schooling, improving infrastructure and building an athletic stadium in the capital. Discussion: The first results of the survey show that the basic system of sports is underdeveloped, which has a bad influence on the development of top sports, because there is no choice and selection of candidates in the first phase. This paper has a theoretical-empirical dimension. When we compare sports attitudes with normative acts, the National Strategy and international acts, we see that there is insufficient investment in sports. Indicators will also be practical moves by the Ministry of Sports, which are promising. However, we realize that the situation is not great either in the highly developed United Kingdom (Beech & Chadwick, 2010). References: Beech, J. & Chadwick S. (2010). Sportski menadžment. Zagreb: Mate, Zagrebačka škola ekonomije i menadžmenta. Djurdjevic, N. (2007). Javne vlasti i sport. Kragujevac: Pravni fakultet. Kokovic, D. (2000). Sociologija sporta. Beograd: Sportska akademija. Skembler, G. (2007). Sport i društvo-istorija, moć i kultura. Beograd: Clio. Tomic, M. (2007). Sportski menadžment. Beograd: Data status.

ORGANIZED ACTIVITY OF CHILDREN WITH EDUCATIVE AND SPORT-RECREATIONAL CONTENT.

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Introduction: The results presented in this paper are part of wider study of children's physical activity. The aim is to present the results of research on the participation of children in organized activities during leisure time, with an emphasis on organized activities of sports and recreational content. Methodology: The research was conducted in four preschool institutions in Novi Sad, by interviewing parents of children from 5 to 7 years old. The results of the research show the participation of children in organized

activities of educational and sports-recreational content. The conducted survey included 164 parents of boys and 166 parents of girls, while the activity diary was filled out by 126 parents of boys and 132 parents of girls. The starting point for the activity diary is the publication Use of Time in the Republic of Serbia, 2010/2011, published by Statistical department of the Republic of Serbia (2012). The results were processed by calculating of percentage values and displaying the frequency of the results. Results: Results show that exactly 70% of children aged 5 to 7 are engaged in organized activities and that children are most often included in programs of foreign language schools and sports schools. Children who attend organized physical activity programs spend about 60 minutes in them. Discussion: Parents of girls are more likely to decide to direct their children to programs such as: music school, foreign language school, drawing school and creative workshop, while boys' parents direct their children to a sports club or school of sports. This can be confirmed by the conclusions drawn in previous research, that parents of boys of this age often encourage their children to organize physical activity, exercise more often with them, and more engage in transport to where they can be physically active (Djordjic, 2006.) Children who attend organized physical activity programs spend about 60 minutes in it. In almost all organized physical activities, boys are more represented, except in those that are conducted with music and where the aesthetic presentation of skills is important (ballet, dance, folklore, etc..). The most common form of organized physical activity of preschool children is the school of sports. In previous studies, it was found that the attendance of the school of sports contributes to the development of children's motor activity and positively influences the morphological characteristics (Popovic, & Stupar, 2011). References: Djordjić, V. (2006). Parents and physical activity of preschool children and children of school age. In Proceedings: Anthropological status and physical activity of children and youth (127-134). Novi Sad: Faculty of Sport and Physical Education. Use of Time in the Republic of Serbia, 2010/2011. (2012). Belgrade: Statistical departement of the Republic of Serbia. Popović, B., & Stupar, D. (2011). Effects of exercising by program on the development of motor abilities of preschool boys. Glasnik Antropološkog društva Srbije, (46), 269-277.

A STUDY ON PHYSICAL ACTIVITIES PARTICIPATION AMONG BOYS AND GIRLS IN TIRANA.

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Introduction: There is a close relationship between physical activity, physical fitness, and health in adults (1.2) and since it is generally accepted that the onset of many chronic diseases occurs in early childhood (3), children and youth are considered important target groups for preventive intervention. Intervention generally should begin at an early age for two reasons. Methods: Approximate 800 questionnaires assessment for (.306 boys and 313 girls, 11 and 14 years old.-randomly selected in 6 different schools in Tirana (Questionnaires from PEACH questionnaires from European Youth Heart Study). Results: The first, in their free time, physical activity even it is very hot or cold outside .The most of boys and girls 11 years old agree (52 % &58%) and strongly agree (19% &12 %). Boys and girls 14 years old agree (60%) and strongly agree (24% & 15%). The second, children 14 years old agree (58%boys and 55 %girls) and strongly agree (17% & 22&), for physical activity during free time even if it is an activity never done before. .3. the social support, or peer support show for 11 years old agree (39% & 44%) and strongly agree(30%&23%), where in total boys are better than girls For 14 years old agree (39% & 44%) and strongly agree (38 % & 26%) where still in total boys are better than girls 4. for playing and

exercise together . 11 years old agree(36% & 35%) and strongly agree(37 % & 35%), where in total boys are better than girls For 14 years old agree (45% & 42%) and strongly agree (38% & 30%) where still in total boys are better than girls .Data show that boys have little bit higher value compared with girls. Discussion: Children 11 and 14 years old have the same desire for physical active participation in boys and girls, .The social support is in high level, but boys are better than girls Boys are better than girls in peer support for exercise and sport. For physical activity during free time children 14 years old are better than 11 years old. For 14 years old in total boys are better than girls .Data show that boys have little bit higher value compared with girls. References: Ness AR and Powles JW. Fruit and vegetables, and cardiovascular disease: a review. Int.J.Epidemiol. 1997;26:1-13. U.S.Department of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General. 1-277. 1996. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion. Berenson GS, Srinivasan SR, and Nicklas TA. Atherosclerosis: a nutritional disease of childhood. Am J Cardiol 1998;82:22T-9T.

THE EFFECT OF PHYSICAL EDUCATION CURRICULUM BETWEEN INITIAL AND FINAL MEASUREMENT IN THE BODY MASS INDEX (BMI) AT AGE 13, 14, AND 15 YEARS FEMALE.

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Introduction: The paper aims at impact the physical education(PE) curriculum between initial and final measurement at body mass index (BMI) in females. This paper is an important paper-experiment in determining the body mass index (BMI) of females as well as the impact of the curriculum of physical education (PE). Methods: Our paper-experiment entity is (N = 100) aged 13, 14, and 15 of the female gender of the primary school "Asdreni" from the village of Gllogje of the municipality of Tearce-Tetovo. In this paper are included two parameters (body mass and body height) and an index (body mass index-BMI). Results: Through the T-test method, significant statistical values have been found between the initial and the final measurement. In the variables of this paper, the experiment shows that body height in the age group 13-14 years has a statistically significant difference, while in the age group 14-15 the distribution of values begins to stabilize. Discussion: However, in body mass, all age groups have normally dispersed values. Through the body mass index (BMI) it shows that treated children have weight within normal limits (Pauši J.2007; Gligorijevic S. 2008). Based on the results we have presented for the paper-experiment we can conclude that the impact of the physical education (PE) curriculum is undeniable in the body mass index (BMI). References: Gligorijevic S, (2008). Acta Medica Medianae, 47 (2), 15-19. Paušic, J.(2009). Konstrukcija i vrednovanje mjernih postupaka za procjenu tjelesnog držanja u djecaka dobi od 10 do 16 godina. F. Kineziološki Zagrebu (Doktorska Disertacija), 79-129. Mandarić S, Sibinović A, Stojiljković S (2011). Physical Education and Sport. 9(3), 307-319. Kovac M, Strel J, Jurak G, Leskosek B (2012). Int. J. Morphol., 30(2), 411-416.

Physiology

COMPARISON OF THE EFFECT OF TWO TRX TRAINING MODELS ON POWER ENDURANCE AND FATIGUE INDEX ON YOUNG TAEKWONDO PLAYERS.

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Introduction: Power endurance and anaerobic capacity are the most important aspects of martial arts. Anaerobic energy system and anaerobic performance may improve by several types of energy system training as well as high intensity interval training (HIIT) system. Total body resistance exercise (TRX) is a new method of supplement training to improving neuromuscular preparation. Applying HIIT training system with TRX training may enhance anaerobic performance among the athletes. The purpose of this study was to compare the effect of two TRX training models on endurance power and fatigue index on young athletes in Taekwondo. Methods: In this study, 36 subjects young Taekwondo players with age of 17/14 ± 6 /040 years, height 161/72 ± 17/054 cm and weight 60/63 ± 23/28 kg, participated in this study and randomly divided into three groups: TRX-HIIT (12 subjects), TRX training group (12 subjects) and control group (12 subjects). Power Endurance and fatigue index were measured before and after 5 weeks of training. BOSCO applied for determination of power endurance using by motion analyzer. Wingate anaerobic test was applied to determination of fatigue index. Results: Analyzing data has been shown that there was a significant difference at power endurance among the groups ($P<0.05$). Has been shown more improvement at power endurance at the TRX-HIIT group. It has been show significant differences at Fatigue index between groups ($P<0.05$). Discussion: According to results of this study power endurance and fatigue index have been improved in groups by TRX-HIIT training model. These data shown that the coaches and athletes may use this model of training at the preparation phase of conditioning specifically during competition phases for maintenance of anaerobic readiness. References: Astorino, T. A., Allen, R. P., Roberson, D. W., & Jurancich, M. (2012). Effect of high-intensity interval training on cardiovascular function, VO2max, and muscular force. The Journal of Strength & Conditioning Research, 26(1), PP138-145. Ball, N., Nolan, E., & Wheeler, K. (2011). Anthropometrical, Physiological, and Tracked Power Profiles of Elite Taekwondo Athletes 9 Weeks before the Olympic Competition Phase. The Journal of Strength & Conditioning Research, 25(10), PP2752-2763.

STRESS LEVEL SELF-EVALUATION IN SPORTING SITUATIONS.

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Introduction: The most important components of stress appearing in sporting situations are the following: specificities of a sporting event or situation; features of subjective evaluation of an event; changes in psychological functioning; physiological changes and experience of the whole process. The analysis of stress influence on sportsmen particularly emphasizes importance of cognitive processes and individual differences in stress situation evaluation as a result of dependency of the factors from environment domain and character features of a person experiencing stress. Methods: Lazarus`s Method (2000) has been significantly applied in the procedure of self-evaluation and stress control level in sporting situations. This method can be used in different sporting stress situations by the sportsmen themselves

who participate in those situations when they feel the need to control the stress level. The Lazarus`s Method is consisted of a series of procedures taken by a sportsman in order to take self-control and optimize their condition based on the psychological stress level in the given moment in the following sequence: 1. Control of the signs of different stress levels expression; 2. Comparison of noticed stress signs with the criteria of optimal stress level; 3. Self-evaluation of psychological stress level in the given moment; 4. Choosing the way of stress self-regulation in order to correct the level; 5. Self-regulation and psychological state control regaining. Taking part in competitions of various importance, with more or less expectations, sportsmen should learn how to make a balance between optimal stress level and their own feelings. Results and Discussion: The results reached in the stress level self-evaluation procedure enable the sportsmen, more or less, to control their condition consciously and actively by monitoring the following indicators of their own psycho-physical condition such as: tonus of muscles, heart frequency, dryness or moisture of mouth, level of sporting excitement, mood features, experience of the rival, etc. in other words, sportsman must learn how to do introspective analysis which would get them a better insight in their psycho-physical condition, Crocker, (1992). On the base of self-evaluation information on their psycho-physical condition characteristics in a certain sporting situation in comparison to some former state seen as a referent state, the sportsman can improve their skills for applying necessary measures for self-control and optimization of their state. Self-evaluation of stress level in sporting situations represents a base for taking adequate actions which would contribute better psychological adjustment of sportsmen. References: Gill, D. L. (1994). A sport and exercise psychology perspective on stress. Quest, 46(1), pp. 20-27. Lazarus, R.S. (2000).Toward better research on stress and coping. American Psychologist, pp. 34-37.

Sociology

IMPACT IDENTIFICATION WITH SUCCESSES MONTENEGRO NATIONAL WATER POLO TEAM.

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Introduction: Sport has a very good position when it comes to the development of national pride, but mostly because there are strong evidence in the scientific literature that the success of national sport team and also organization of major sport events such as world and continental competitions can increase self-esteem and national pride. (Dauncey, & Hare, 1999; Gavin, 2007; Karkatsoulis, Michalopoulos, & Moustakatou, 2005). Methods: The survey was conducted in 2013 and the questionnaires were distributed in three cities which were located in different regions of Montenegro, primarily in Bar and Kotor, which are located in the southern region, then in Podgorica as the capital, Niksic, which is located in Central region, as well as in Bijelo Polje and Mojkovac which are located in the northern region. A total of 700 questionnaires were collected, but the 31 questionnaire was excluded from the analysis because they were not properly filled out, so that the study included a total of 669 respondents. Empirical data were analysed using Statistical Package for the Social Science (SPSS 20.0). Results: By the analysis of the results received was showed that 36 respondents or 5.4% have identified with the national water polo team of Montenegro. Discussion: The research showed that only 5.4% of respondents identified with the Montenegrin water polo team, which is a disappointing fact. It is assumed that the reason for fourth

place at the Olympic Games in London in 2012 when the survey was done. We forget the fact that the sun as water polo first cheered as debutants became the champions of Europe in 2008 in Malaga, they continue winning medals at major competitions and water polo in Montenegro most awarded sport. References: Dauncey, H., & Hare, G. (1999). France and the 1998 World Cup: The national impact of a world sporting event. London: Frank Caas. Gavin, M. H. (2007). Narrating tragedy: from Kennedy to Katrina, from sports to national identities. Unpublished Doctoral Dissertation. College Park, MD: University of Maryland. Karkatsoulis, P., Michalopoulos, N., & Moustakatou, V. (2005). The national identity as a motivational factor for better performance in the public sector: The case of the volunteers of the Athens 2004 Olympic Games. International Journal of Productivity and Performance Management, 54(7), 579–594.

THE INFLUENCE OF MANAGERS ETHICH ON SPORTS EVENTS.

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Introduction: The objective of this study represents the sports managers and their impact on sports events, while the main goal will be directional to explaining the ethics of sport managers in sports events. The main aim of the study is basically to discuss and explain the position of sports managers in sports events and sports generally, their increasing influence on sports, athletes and competition, ethical dilemmas in which sports managers are encountered and the ultimate result of their action on all participants in sports. Method: A descriptive method was used for making this study. The author also consulted with the relevant literature and the latest research and experience from this field. The authors used the analytical and parallel methods that have proved to be the most productive in these types of research. Results and Discussion: The role of sports is to promote and to create a better and more productive society, while ethics as a moral science has the role of directing us into the basic elements of morality and showing true and true values. Management is increasingly becoming the leading philosophy in sports, although sports organizations do not belong to the production sector. In modern sports, the role of managers as traders is replaced by the role of strategist and creator of the success of sports organizations. Management in sports organizations should be mastered by professionals in sports. The most suitable and best option is that experts in the field of sports with management knowledge manage processes in sports organizations. In professional sport, one thing is certain, today, especially in the future, without managers cannot focus and devise relevant processes, because they have a decisive role in the positive outcome of any action. References: Adair, D. (2017). Sport Management with Historical Perspective. International Journal of the History of Sport, Vol. 34 (No. 5-6), 309-314. Boxill, J. (2002). Ethics and Sport. Blackwell: Oxford. DeSensi, J. & Rosenberg, D. (2011). Ethics and Morality in Sport Management. Sport, Ethics, and Philosophy, Vol. 5 (No. 4), 457-459. Milasinovic, R. (2015). Etika aktera u sportskim dogadjajima, unpublished master thesis. Novi Sad: Univerzitet u Novom Sadu, Asocijacija centara za interdisciplinarne i multidisciplinarne studije I istraživanja. Çiftçi, S. (2014). The Research of Qualifications of Sport Manager. Procedia - Social and Behavioral Sciences, Vol. 152, 740-745.

Sport Management

THE ANALYSIS AND CHARACTERISTICS OF NON- PROFIT SPORT ORGANIZATIONS.

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Introduction: The first purpose was to start with systematic planning and investment in the construction of sports infrastructure, legal and promotion of sport organizations will be one of the main priorities of the development of sports in Kosovo. As another purpose of this work would be the organizational structure of sports organizations, since after the war until now, most of them operate as NGO (non-governmental organization), Clubs, Sport Federations, various Associations etc. Methods: The subject of this study was the systematic review from the available literature about the structure and planning of sports organizations. Based on data from the for sport organizations, clubs, associations, sports Federations in Kosovo. We need to develop a strategy that will fulfill closely the structuring of all sports organizations for getting involved in sports activities in our country with the required standards by the relevant international institutions. Results: Through this work we have managed to identify all the experiences and advantages of structural sports organizations from many European countries (Skoric et al., 2011) based on their experiences and we will benefit from increasing the quality structure of functioning within a sports organization, Club, Federation or Association in our country. Discussion: The new system of sports in Kosovo should be oriented towards the athletes and citizens that are dealing with physical activity. The period for the implementation of the strategy (Alaj, 2016) for sport will include a wide range of changes in legislative and financial system of sport in the Republic of Kosovo. This will be the period when the priorities will be education of personnel in the field of sport and the opportunity to utilize potential financing, familiarizing with EU standards in the field of politics and sport (Kiriemadis,Th. & Theakou, E. 2007). References: Aćimović.D. et al., (2013). Act.in Phy.Ed. and Sp. 3, (2) 251-253. Alaj,I.(2016),U CLB (Unpublished master degree). Gomez,S.,et al.,.(2007).IESE. Kiriemadis,Th. & Theakou, E. (2007) .SMIJ, Vol.3 nr.2, 27-37.

ATTITUDES OF CONSUMERS FROM PODGORICA TOWARD ADVERTISING THROUGH SPORT AMONG THE FREQUENCY OF WATCHING SPORTS EVENTS.

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Introduction: This investigation was aimed at gaining relevant knowledge about the attitudes of Podgorica consumers toward advertising through sport among. Method: The sample included 330 students from Faculty of Economics in Podgorica, divided into six subsample groups: consumers, who do not watch sports events at all, then consumers who watch sports events 1-30 minutes, next 31-60 minutes, 61-90 minutes, 91-120 minutes, as well as consumers who watch sports events more than 120 minutes during the typical day. The sample of variables contained the system of three general attitudes which were modelled by seven-point Likert scale. The results of the measuring were analyzed by multivariate analysis (MANOVA) and univariate analysis (ANOVA) and Post Hoc test. Based on the statistical analyses it was found that significant differences occur at multivariate level, as well as between all three variables at a significance level of p=.00. Results: Hence, it is interesting to highlight that it was found there are significant differences showed up

between the attitudes of consumers toward advertising through sport among the frequency of watching sports events. The significant differences were found in two of three variables, while the consumers who do not watch sports events had much more negative attitudes toward advertising though sport. Discussion: These results are so important for the marketers, mostly due to the reason they can't merge all the potential consumers regarding the frequency they watch the sports events. On the other hand, the reached results were in parallel to the previous investigations and this observation presents relevant information for the further marketing campaigns. References: Masanovic B, Zoric G, Gardasevic J (2018). J. Anthr. Sport Phys. Educ., 2(1), 9-13. Masanovic B, Zoric G, Gardasevic J (2017). J. Anthr. Sport Phys. Educ., 1(1), 3-7.

ATTITUDES OF CONSUMERS FROM PODGORICA TOWARD ADVERTISING THROUGH SPORT AMONG THE QUESTION HOW OFTEN CONSUMERS PURCHASE SPORTING GOODS.

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Introduction: This research was aimed at gaining relevant knowledge about the attitudes of Podgorica consumers toward advertising through sport among the question how often consumers purchase sporting goods. Method: The sample included 330 students from Faculty of Economics in Podgorica, divided into six subsample groups: consumers who do not purchase sport goods at all, then consumers who purchase sport goods less than ones a month, next 1–3 a month, 4–6 a month, 7–9 a month, as well as consumers who purchase sport goods more than 10 times a month. The sample of variables contained the system of three general attitudes which were modelled by seven-point Likert scale. The results of the measuring were analyzed by multivariate analysis (MANOVA) and univariate analysis (ANOVA) and Post Hoc test. Based on the statistical analyses it was found that significant differences occur at multivariate level, as well as between all three variables at a significance level of (p=.000). Results: Hence, it is interesting to highlight that it was found there were significant differences showed up between the consumers who purchase sport goods. The significant differences were found in two of three variables, while the consumers who purchase sport goods less than 3 times a moths had much more negative attitudes toward advertising though sport. Discussion: These results are so important for the marketers, mostly due to the reason they can't merge all the potential consumers regarding the frequency they watch the sports events. On the other hand, the reached results were in parallel to the previous investigations and this observation presents relevant information for the further marketing campaigns. References: Zoric G, Masanovic B, Gardasevic J (2018). J. Anthr. Sport Phys. Educ., 2(1), 21-25. Zoric G, Masanovic B, Gardasevic J (2017). J. Anthr. Sport Phys. Educ., 1(1), 17-21.

ATTITUDES OF CONSUMERS FROM PODGORICA TOWARD ADVERTISING THROUGH SPORT AMONG THE QUESTION HOW OFTEN THEY PARTICIPATE IN SPORTS ACTIVITIES.

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Introduction: This research was aimed at gaining relevant knowledge about the attitudes of Podgorica consumers toward advertising through sport among the question how often they participate in sports

activities. Method: The sample included 330 students from Faculty of Economics in Podgorica, divided into six subsample groups: consumers who do not participate in sport activities at all, then consumers who participate in sport activities less than ones a month, next 1–4 a month, 5–10 a month, 11–20 a month, as well as consumers participate in sport activities more than 20 times a month. The sample of variables contained the system of three general attitudes which were modelled by seven-point Likert scale. The results of the measuring were analyzed by multivariate analysis (MANOVA) and univariate analysis (ANOVA) and Post Hoc test. Based on the statistical analyses it was found that significant differences occur at multivariate level, as well as between all three variables at a significance level of p=.000. Results: Hence, it is interesting to highlight that it was found there are significant differences showed up between the consumers who participate in various sports activities. The significant differences were found in one of three variables, while the consumers who participate less than 4 times a moths had much more negative attitudes toward advertising though sport. Discussion: These results are so important for the marketers, mostly due to the reason they can't merge all the potential consumers regarding the frequency they watch the sports events. On the other hand, the reached results were in parallel to the previous investigations and this observation presents relevant information for the further marketing campaigns. References: Gardasevic J, Zoric G, Masanovic B (2018). J. Anthr. Sport Phys. Educ., 2(1), 15-19. Gardasevic J, Zoric G, Masanovic B (2017). J. Anthr. Sport Phys. Educ., 1(1), 23-27.

Sport Statistics and Analyses

COMPARATIVE ANALYSIS OF ANTROPOMETRIC INDICATORS OF SPORTISTS OF DIFFERENT SPORTS GUIDANCE.

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Introduction: The main goal of this research is to determine whether there are statistically significant differences in the level of anthropometric indicators among athletes of different sports directions (footballers, basketball players and volleyball players), that is, to determine the differences in the changes in the anthropometric indicators of athletes. Methods: In accordance with the goal, a transversal study was conducted in which the empirical and statistical methods were applied, and the research technique was testing. The study was conducted on a sample of 75 subjects, a male sex divided into three subunits, an age range of 13 to 15 years. In this study, 10 anthropometric variables were tested: body height, arm length, leg length, knee diameter, bicrystalline range, bi-chromium range, body mass, median volume of the thorax, circumference, upper abdomen, skin abdomen and skin set of lower legs. An analysis of ANOVA variance, multivariate analysis of MANOVA variance, LSD-test between all combinations and discriminatory analysis between all three sub-assays was used to determine differences within groups. Results: A statistically significant canonical discriminatory factor with a characteristic root of 0.24, a canonical correlation with a value of 5.25, Wilks's lambda was isolated from the discriminatory analysis between all athletes of different sports orientations. Hi- square value, number of degrees of freedom and level of significance 0.00 is statistically significant. According to the values of the centroid of the groups, a statistically significant difference within the groups was observed on the discriminatory function. Discussion: On the basis of the obtained results, it can be concluded that there are statistically significant differences in anthropometric indicators in athletes of different sports orientations. This research can be used by trainers who realize training programs with these and other athletes in order to achieve better

results. References: Bjelica, D. (2005). Sistematizacija sportskih disciplina i sportski trening. Podgorica: Crnogorska sportska akademija. Bjelica, D. (2013). Teorija sportskog treninga. Podgorica: Univerzitet Crne Gore. Bjelica, D., & Fratrić, F. (2011). Sportskitrening: teorija, metodika i dijagnostika. Nikšić: Fakultetza sport i fizičko vaspitanje. Bjelica, D., Georgiev, G., & Muratović, A. (2012). Basic motor abilities of young handball players from Montenegro. Sport Science 5 (1), 71-76. Vukotić, M. (2010). Nivo morfoloških karakteristika, motoričkih i funkcionalnih sposobnost isportist arazličitog sportskog usmjerenja. Neobjavljena magistarska teza.Nikšić: Fakultet za sport i fizičkovaspitanje.

ANALYZING "APPLIED STATISTICS" COURSE LEARNING OUTCOMES FROM A SPORT STUDENT-CENTERED PERSPECTIVE.

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Introduction: The purpose of this cross sectional study was to investigate the effectiveness of teaching and learning Statistics from a student centered perspective in higher education institutions. Statistics education (Lane & Hall & Lane, 2004) has emphasized the application of tangible and interesting examples in order to motivate students learning about statistical concepts. Methods: Participants in this study were 112 bachelor students enrolled in the "Applied Statistics" course in Sports University of Tirana. Experimental group students received a student-centered teaching approach; Control group students received an instructor-centered teaching approach. Statistical tests were performed using IBM SPSS Statistics (version 22). Results: This study found out that student-centered approach group had statistically significantly higher assessments scores (5.80 ± 0.38) at the end of the evaluation compared to instructor-centered teaching approach student group (6.15 ± 0.52). Independent samples t-test was used to compare scores between control and experimental group. T-test results revealed a significant difference ($t(38) = 2.428$, $p = 0.020$) between student-centered teaching group assessment - mean score and instructor-centered teaching group assessment- mean score. Discussion: Results concluded that student-centered perspective can improve student positive attitude ($p<0.05$) to statistical methods and to motivate project work. Therefore findings of this study may be very useful to the higher education institutions to establish their learning strategies especially for courses related to Statistics and sport students. References: Lane A., Hall R., Lane J. (2004) Self-efficacy and statistics performance among Sport Studies students. Teaching in Higher Education Journal, Vol. 9 , 435-448.

LATENT STRUCTURE OF THE MORPHOLOGICAL CHARACTERISTICS, MOTOR BASIC AND SITUATIONAL TEST OF BASKETBALL GAME 14-15 YEARS.

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Introduction: The purpose of this research is latent structure of the morphological characteristics motor basic and situational test of basketball game 14-15 years. Methods: The sample was of 84 basketball players aged 14-15 who have followed the training process of basketball game. The variable sample is 23, 11 of them in morphological space, 8 tests in the area of basic motor character and 4 of them in

situational motor of basketball game. Results: In this research-our experiment are extracted two main components which explains 79.16% the general variance of the morphological system, from which are extracted two morphological elements, with this we confirmed the previous scientific knowledge that was enabled to use during the research more precisely in extracting the latent structure in the morphological area. While in the motor area are extracted three main components that explain together 63.60% the variance of the basic and situational motor system of which three factors are extracted. Discussion: In the morphological area are extracted same elements between basketball players and our colleagues from Montenegro and Croatia (Hadzic R. et al…2016; Trninić, M., et al…2013). Also in the motor area are taken the same elements for comparison researches of our colleagues form Bosnia and Herzegovina and Croatia (Daskalovski B., et al...2011; Jukić, I., et al…. 2005) obtained results may have an excuse or methodological approach applied to the research of the latent structure on the morphological characteristics and basic, typical motor testing of the basketball game, in particular we have an overview of structure of the basketball game. References: Kocić, J. & Antonijević, S.(2013). Crnogorska Sportska Akademija„Sport Mont“. (37), 364-369. Jukić, I., Milanović, D. & Vuleta, D.(2005). Kinesiologica 37 (2), 182-194. Hadzic R. Vujović D. Petković J. Petković J. Nikšić E. Đukić M. (2016). Sport and health (Tetovo) 3 (5-6). Daskalovski B., Naumovski M. (2011). 1st International Conference on SPORTSKE NAUKE I ZDRAVLJE/ Sports Science and Health Banja Luka. 305-313.

RESEARCH AND WRITING DEVELOPMENT IN THE AREA OF SPORT SCIENCE PUBLISHING IN MONTENEGRO FROM 2002 TO 2017.

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Introduction: Bibliometric studies have, by and large, focused on the features of the fundamental sciences rather than the interdisciplinary sciences. Prior research has been highly focused on natural and technical science disciplines and not many investigations have dealt with the Sports Sciences as one of the most emerging and popular science nowadays. For example, over 25,000 is published annually in the area of Sports Sciences, and it is equal as in most natural and technical science disciplines. Hence, the purpose of this study is to analyses the personal scientific production of Montenegrin sports sciences researchers, as well as trend of publication within Montenegrin sports sciences journals. Methods: This investigation subject included the studies published in the period from 2002 to 2017 that have been focused on the sports sciences issues. An electronic databases (Google Scholar) was searched for original research articles available until December 2017. Then research findings were summarized in accordance with the PRISMA guidelines and the number of citation, h-index and i10-index was presented. Results and discussion: Results of this study indicated that the sports sciences researchers rapidly increased the number of publications from 2002 to 2017 and switch the writing language from Montenegrin to English, especially in last five year. The number of citations span from 100 and 500 within most of researchers, while h-index and i10-index span from 4 to 12 in most cases. On the other hand, there are three registered Montenegrin journals, and Sport Mont journal (over 1000 articles published since 2002) is the most cited one, while the h-index is equal with Montenegrin Journal of Sports Science and Medicine (over 60 articles) that has the highest i10-index (8). Journal of Anthropology of Sport and Physical Education (just seven articles) was established in 2017 and the relevant analyses could not be possible to be completed. Conclusion: It is indicated that the highest impact is recognized in 2017, regarding to citations of available researches published by Montenegrin authors, as well as

writing style of articles published in English. Hence, the further deployment is expected in upcoming period. Reference: Popovic S, Bjelica D, Gardasevic J. (2017). Changing Publication Patterns in the Field of Physical Education from 2003 to 2017 in Montenegro. In Proceedings of 12th FIEP European Congress "Changes in Childhood and Adolescence: Current Challenges for Physical Education" (276), Luxembourg: University of Luxembourg.

Sports Medicine

RECONSTRUCTION OF MEDIAL PATELLOFEMORAL LIGAMENT IN ATHLETES.

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Introduction: Medial patelloformal ligament (MPFL) is recognized as the most important stabilizing ligament which prevents lateral patellar dislocation. MPFL reconstruction was indicated with patients with repeated dislocations, subluxations and functional instability caused by patelloformal pain; said patients initially underwent non-operative techniques to resolve post-traumatic pattelar instability. Goal: The goal of this study is to explain indication and operative technique for definitive reconstruction of MPFL, which is a pre-condition to early mobility and favourable functional result. Material: Between 2012 and 2016, we operated on seven patients (five women and three men) at the Clinical Center in Podgorica. Four patients were active athletes; three patients were engaged in recreational sport activities. The youngest patient was 15; the oldest patient was 21. We explained a simple MPFL reconstruction technique using autograph gracilis tendons. Results: Primary healing was reached in all seven patients. There were no infections, necrosis or graft absorption. All patients were monitored, on average, 10,6 months post-surgery. At their last check-up, none of the patients reported any pain, swelling or patellar instability and each of them accomplished full mobility. Conclusion: Anatomic MPFL reconstruction is efficient for recurring patellar subluxations and affords an excellent functional recovery of patellar mechanism. References: Zaffagnini S, Colle F, Lopomo N, Sharma B, Bignozzi S, Dejour D, Marcacci M. The influence of medial patellofemoral ligament on patellofemoral joint kinematics and patellar stability. Knee Surg Sports Traumatol Arthrosc. 2013 Sep; 21(9):2164-71. Epub 2012 Nov 24. Smirk C, Morris H. The anatomy and reconstruction of the medial patellofemoral ligament. Knee. 2003 Sep; 10(3):221-7. Brent Fisher, John Nyland, EmilyBrand, BrianCurtin. Medial Patellofemoral Ligament Reconstruction for Recurrent Patellar Dislocation: A Systematic Review Including Rehabilitation and Return-to-Sports Efficacy. Arthroscopy: The Journal of Arthroscopic & Related Surgery. Volume 26, Issue 10, October 2010, Pg: 1384-1394.

METABOLIC RESPONSES IN THE ANNUAL TRAINING CYCLE OF HIGHLY TRAINED CROSS-COUNTRY SKIERS.

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Introduction: Research of biochemical metabolites and vitamin statuses met with great interest in the world of sports because of their key role in enhancing physical performance. These parameters allow control

of functional state of the athletes, estimation of efficiency and rationality of the training program, and also indicate pathological changes of metabolism. The aim of this work was to estimate the biochemical status of highly trained skiers during the year. Methods: Data was collected multiply from 51 members of regional and national team (men, age 18–27 years) during both training and competitive periods. Results: The body mass index of skiers was 23 kg/m2, body fat percentage was 11%, which conformed to recommended norms. We found that the levels of glucose and lactate decreased by 11% and 30% respectively from the beginning of the training cycle to its end. The levels of pyruvate in the blood of skiers increased fourfold in the training period compared with the competitive period. Our results showed a decrease in oxidation of carbohydrates associated with endurance training in athletes (Schwellnus, 2008). In the training period we found markers of an increased fat utilization in the athletes with higher qualification compared to the athletes with lower class of sportsmanship. The levels of total, LDL-, and HDL-cholesterolin the blood plasma were significantly lower in skiers compared with non-athletes. The plasma fatty acid profile in skiers was characterized by a decreased percentage of saturated fatty acids and n3-linolenic and docosahexaenoic acids. Revealed patterns showed an activation of lipid metabolism during training period. The mean plasma concentrations of the nitric oxide metabolites (NOx) were in the normal range within year. The NOx levels decreased by 24% by the competitive period of compared to beginning the training cycle. We believe it was caused by very intense physical activity in the competitive period depleting the NOx reserves. We found that the levels of vitamins A, E, B1, B2, C were decreased in the skiers, with occurring episodes of polyhypovitaminoses. The beginning of the training period was characterized by the highest levels of vitamins, excluding vitamin A. We found that during the intensive training there was a significant increase of hypovitaminoses occurrence in the skiers (Boĭko et al., 2008). Conclusion: We assume that the high levels of physical activity, changes in the diet, and in the gastrointestinal tract function might have contributed to the observed changes. The correction of these metabolic changes during the training period could possibly improve the functional status of skiers and their physical performance. References: Boĭko, ER, Potolitsyna, NN, Boĭko, SG, Larina, VE, Zelenov, VA. Functional reserves of humans in North condition and its providing of fat-soluble vitamins // Vopr Pitan. 2008;77(3):64-67. Schwellnus P. Olympic textbook of medicine in sport. Chicester, United Kingdom: “John Wiley and Sons Ltd”, 2008. 624p.

Training and Testing

EFFECTS OF PREPARATION PERIOD ON ENDURANCE IN U-18 FOOTBALL PLAYERS.

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Introduction: The main aim of the research was to identify a level of quantitative changes of the endurance with U18 years old football players under the influence of the programmed football training of a six weeks preparation period. Methods: According to the time orientation this was a longitudinal study with the aim to define a quantitative changes of the endurance under the influence of the programmed football training with football players U18, which involved a summer preparation period of forty-two days. The training programme covered forty-four training units (Gardašević et al., 2016a; Gardašević et al., 2016b). The research was made on a sample of 25 football players U18. To estimate the endurance three tests have been used: Cooper test, Running 15m long distance for 90s and Pin running persistance. For determining differences in the variables at the beginning and at the end of training program we used

discriminant parametric procedure t-test for big paired samples. Results: Based on the numerical values of the t-test it can be concluded that there are statistically significant differences in all three variables to estimate the endurance. This confirmed the hypothesis that the expected significant positive quantitative changes influenced by the proposed model of training in preparation period with U18 years old football players. Discussion: In this research the authors were guided by the fact that this kind of training program in preparation period, where dominates the situational model training is very effective in terms of raising the endurance level with U18 years old. The obtained results can be directed towards innovation plans and programs in the preparation period, and the adaptation of the same needs of the respective population (Gardašević et al., 2015; Gardašević & Bjelica, 2014). References: Gardasevic, J., Popovic, S. & Bjelica, D. (2016). After preparation period ball shooting accuracy at players U15. In Abstract Book of the 8th Conference for Youth Sport (88), Ljubljana: University of Ljubljana, Faculty of Sport Gardasevic, J., Bjelica, D., Milasinović, R., & Vasiljevic, I. (2016). The Effects of the Training in the Preparation Period on the Repetitive Strength Transformation with Cadet Level Football Players. Sport Mont, 14(2), 31-33. udc 796.332-053.6(497.16 Gardašević, J., Bjelica, D., & Vasiljević, I. (2016). Six-Week Preparation Period and its Effects on Transformation Movement Speed with Football Players Under 16. Sport Mont, 14(1), 13-16. udc 796.13:796.332-053. Gardasevic, J., Bjelica, D., & Vasiljevic, I. (2017). The Strength of Kicking the Ball after Preparation Period with U15 Football Players. Sport Mont, 15(2), 39-42. udc 796.332-053.6

BODY COMPOSITION AND PHYSICAL FITNESS OF POLICE CADETS: CORRELATIVE ANALYSIS.

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Introduction: There is a negative effect of increased body mass and fat mass on occupational performance, injury rate and health in police workforce. The main goal of this study was to identify positive and negative interactions between active and ballast components of body composition and results in physical fitness testing in Cadets at Abu Dhabi Police College (ADPC). Methods: The study included 76 healthy male participants (BM=68.07±8.81 kg, BH=174.55±5.86 cm, Age=20.46±0.9 year). Cadets were involved in regular physical training as part of the education curriculum. The body composition was measured by the bioelectric impedance method (InBody 370), while the physical abilities were measured according to the ADPC protocol (Cvorovic et al., 2017), consisted of maximal number of Push-ups (PU) and Sit-ups (SU) in 1-minute and 2.4 km running test (RU). For statistical analysis were used descriptive statistics (mean and SD) and Pearson's correlation test using SPSS 20. Results: Descriptive statistics for physical abilities: PU=40.93±6.18 reps, SU=44.13±5.27 reps and RU=593.67±32.17 seconds. Pearson's correlation showed that body fat (BF), fat of trunk (FT) and body mass (BM) negatively correlated with PU (r=-0.373, p=0.001; r=-0.365, p=0.001; r=-293, p=0.010, respectively). BF and FT positively correlated with RU (r=0.309, p=0.007; r=0.303, p=0.008, respectively). Discussion: According to results, BF and FT negatively affects PU and RU performance. Note that the positive correlation occurred between RU and BF indicate negative correlation between these two since better RU means shorter time (Violanti et al, 2017). On the other side, there was no significant correlation between fat free mass, skeletal muscle mass and soft lean mass. The explanation may be due to sample's homogeneity since all Cadets had to go through the same recruitment procedures, and because of the physical and tactical training methodology, which mostly contains muscular or aerobic components of endurance in order to pass the tests. Moreover,

Pu and SU results are at 70th and 65th percentile of Cooper Institute scale, while RU is at 85th percentile, which additionally suggests that endurance training was present more than strength and power training. References: Cvorovic A, Maamari A (2017). Differences in key performance indicators between police college cadets in different semesters of their education. In: Proceedings from the "Archibald Reis Days", November 7-9, 2017; Belgrade, Serbia. Physical Fitness Assessments and Norms for Adults and Law Enforcement (2013). Dallas, TX: The Cooper Institute. Violanti JM, Ma CC, Fekedulegn D, Andrew, ME, Gu, JK, Hartley, TA, … Burchfiel, CM (2017). Associations Between Body Fat Percentage and Fitness among Police Officers: A Statewide Study. Safety and Health at Work, 8(1), 36–41.

THE STRUCTURE OF MOTORIC AND FUNCTIONAL ABILITIES OF THE JUNIOR FEMALE BADMINTON NATIONAL TEAM.

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Introduction: Little is known which are the dominant characteristics and abilities on which success in badminton directly depends. Certainly, a specific movement structure occupies the highest position but there are few pieces of research from this segment, so this game is expected to improve a lot in the near future, thanks to scientific evidence and knowledge. The goal of the research is to determine the structure of motoric and functional abilities of the junior female badminton national team. Methods: The sample included 13 players of the junior female badminton national team of the Republic of Serbia. 14 tests in total were applied for the assessment of motoric and functional abilities. The structure of motoric and functional abilities was determined by correlation coefficients and factor analysis. Results: By analysing the structure of components it is clear that the first component is made of all the tests for the assessment of speed, agility, and explosive strength and they are all saturated by the strength. This factor could be interpreted as a factor of explosive strength and muscular endurance of low extremities. Discussion: The greatest part of the energy is obtained from aerobic sources, i.e. top international badminton players have relative maximal consumption of oxygen from 55.7 to 73 mlO2/kg/min (Mikkelsen, 1979; Chin et. al, 1995; Faccini and dalMonte, 1996; Omosegaard, 1996; Majumdar et. al. 1997). In the conducted research, judging by the results of the Shuttle run test, those values are lower but values above the average in the group are all above 50 mlO2/kg/min. It was found that girls had 56% of slow muscle fibres and that aerobic adaptation in badminton resulted in hypertrophy of slow muscle fibres by 8% more than fast muscle fibres of the a type (Fta) and by 18% more than the b type (FTb) (Mikkelsen, 1979). References: Chin, M., Wong, A.S.K., So, R.C.H., Siu, O.T., Steininger, K. i Lo, D.T.L. (1995). Sport specific testing of elite badminton players. British Journal of Sports Medicine, 29(3): 153-157. Faccini, P. i Dalmonte, A. (1996). Physiologic demands of badminton match play. The American Journal of Sports Medicine, 24(6): 564-566. Majumdar, P., Khanna, G.L., Malik, V., Sachdeva, S., Arif, M.D. i Mandal, M. (1997). Physiological analysis to quantify training load in badminton. British Journal of Sports Medicine, 31: 342-345. Mikkelsen, F. (1979). Physical demands and muscle adaptation in elite badminton players. In: J. Terauds (Ed.), Science in Racquet Sports (55 – 67). Del Mar, CA: Academic. Omosegaard, B. (1996). Physical Training for Badminton. Denmark: Malling Beck.

DIFFERENCES IN REPETITIVE STRENGHT AND STRENGHT OF KICKING A BALL BETWEEN FOOTBALL PLAYERS OF PIONEER CATEGORY AND CHILDREN WHO ARE NOT INVOLVED IN FOOTBALL.

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Introduction: The achievement of remarkable results in sport activities is conditioned by high conditional preparation and the segment of strength is therefore one of the most important. The high level development of all segments of strength represents one of the basic prerequisites for successful implementation of different requirements of football game. The research is conducted with the aim of setting out the differences in repetitive strength of legs, torso, hands and shoulder girdle and strength of kicking a ball between football players of pioneer category and children who are not involved in football. Methods: The sample consisted of 40 respondents divided into two groups of 20 whose chronological age 12,45±0,41years. Canonical discriminant analysis within set of four motoric variables is used to determine the basic difference between groups and the contribution of each variable taken individually in overall discrimination groups. Results: Based on results it was concluded that abilities treated by popular t-test statistics is on a higher level among children who are involved in training football and therefore it can be attributed to transformational process of training. Discussion: Age category of respondents is explained on the basis of sensitive period for development of general endurance and endurance in dynamic strength (Krsmanović, 1999; Nićin, 2000), and therefore it is supposed that the training process through its various jolts and movements made an impact on achieved differences within treated abilities on behalf of respondents who train football. The results of research of some anthropometric characteristic of children who are not involved in sport and children involved in football training (Molnar, 1998) show the significant difference of repetitive strength level on a behalf of children who were training football. References: Idrizović, Dž. i Idrizović, K. (2001). Osnovi antropomotorike. Podgorica: Univerzitet Crne Gore, Filozofski fakultet. Krsmanović, B. (1999). Teorija i metodika fizičkog vaspitanja. Novi Sad: Univerzitet u Novom Sadu, Fakultet fizičke kulture. Molnar, S. (1998). Morfološke karakteristike i motoričko-fumkcionalne sposobnosti dece koja treniraju fudbal i dece koja se ne bave sportom. Magistarski rad, Novi Sad: Fakultet sporta i fizičkog vaspitanja. Nićin, Đ. (2000). Antropomotorika-teorija. Novi Sad: Univerzitet u Novom Sadu, Fakultet fizičke kulture. Rakočević, T. (1997). Korelacija nekih motoričkih dimenzija kod fudbalera početnika. Fizička kultura, (1-2), 40-49.

PHYSIOLOGICAL PROFILE OF SENIOR SOCCER PLAYERS.

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Introduction: The aim of this research was to determine the physiological profile of senior Montenegrin soccer players. Methods: The participants for this study were 35 soccer players who play in the first national soccer league of Montenegro. The subjects were the following: 5 goalkeepers, 8 defenders, 14 midfield players and 8 forwards, aged 20-32 years with an average playing experience of 11,10±2,01 years. The players were tested at the beginning of the 2017/18 competition season. Physical abilities tests was conducted by performing 8 motor function tests: countermovement jump, 10 m sprint, 20 m "flying"

sprint, 30 m sprint, zigzag, zigzag with ball, 300 yards and Yo-Yo intermittent recovery test (level 2). All tests were performed on an outdoor grass pitch, and electronic timing gates were used to record completion times. Results: Physiological profile of Montenegrin soccer players noted in this study shows a significant level of diversity in relation to previous studies in the best European leagues. Discussion: Overall relation between physiological potential of Montenegrin players with those from other countries shows that when it comes to potential of high genetic predisposition they are at the lower level than other European soccer players. In the area of aerobic qualities, which point to a quality of specific realization and which are dependent on a quality training of this kind, they are lagging behind the players from other areas. Team profile of Montenegrin soccer players, on the basis of all the applied tests, except for YYIRTL2, CMJ and 10 m sprint, shows they are at a similar, but lower level with the results achieved by soccer players in previous researches. Values of results in tests YYIRTL2, CMJ and 10 m sprint, differ from these standards, so that the results of the soccer players from Montenegro statistically significantly lower than the value of the results in the tests of the best European league players. References: Chamari K, Hachana Y, Kaouech F, Jeddi R, Moussa-Chamari I, Wisløff U (2005). Br J Sports Med, 39(1), 24–28. Chamari K, Chaouachi A, Hambli M, Kaouech F, Wisløff U, Castagna C (2008). J Strength Cond Res, 22(3) 944–950. Hoffman J, Kang J (2003). J Strength Cond Res, 17, 109-114. Idrizović K (2014). Kond trening, 12(1), 56-67. Mangine RE, Noyes FR, Mullen MP, Barber S (1990). J Orthop Sports Phys Ther, 12, 147-52. Raven PB, Gettman LR, Pollock ML (1976). Br J Sports Med, 10, 209-16. Turner Anthony N, Stewart Perry F (2014). Strength Cond J, 36(4), 1-13.

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

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Introduction: The aim of this study is to define the difference of the motor skills young football players in Serbia with relation to the position on the field. We tested 157 prospective players in U14 selection. In relation to the position of team participants were divided into 4 groups: Goalkeepers: N = 20, N = 43 defenders, midfielders N = 50 and N = 44 attackers. Method: Football players performed a standardized specific field tests in order to assess speed (sprint 10m, 20m starting acceleration and 30m sprint), agility (zig-zag test without the ball and with the ball CCL), leg power (vertical jump). The results were analyzed by applying descriptive statistics and multivariate analysis. Results: Multivariate statistical analysis established that there isn`t a significant difference at all observed performance (Wilks´ Lambda 0.768, F=1.486, p=0.058), among the observed sub-samples. Statistically significant difference was established at following variables regarding the observed sub-samples: in 20LS F=3.878, p=0.010, in, F = 30s 3.561, p = 0.016, in CCL F = 2.864, p = 0.039 and VSZR F=3.452, p = 0.018). Also, the level of partial results showed significant differences in the variables 20m acceleration (20LS) between midfielders and forwards (0.1016s difference, p = 0.011), the variable 30m between the midfielders and forwards (0.1344s difference p = 0.035), the variable CCL between goalkeeper and strikers (0.3513s difference p = 0.41), VSZR between the midfielder and strikers (-3.5052 difference 0.011). Conclusion: Based on the results, it can be assumed that the effect of the differences identified specific training adaptation processes that apply to football players at different positions in the team. On the basis of apparent differences in the results of the tested players can establish a criterion for promotion of technology training process of young players and long-term plans in the training process. References: Ivanovic, J. , Gajević, A.,

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DIFFERENCES OF Q ANGLE IN MALE AND FEMALE ATHLETES.

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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 assessing 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. References: Heiderscheit BC (1999) Med Sci Sports Exerc. 31(9):1313–1319. Emami MJ (2007) Arch Iran Med. 10(1):24–26. Biedert RM, Warnke K. (2001) Arch Orthop Trauma Surg. 121(6):346–349. Livingston LA, Spaulding SJ. (2002) J Athl Train. 37(3):252–255. Woodland LH, Francis RS. (1992) Am J Sports Med. 20(2):208–211.

IMPACT OF STRETCHING PROGRAMS ON AGILITY PERFORMANCE OF YOUNG FOOTBALL PLAYERS.

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Introduction: During a football game a player performs various activities around 1200-1400, of which 700-800 motoric with change of movements direction (sprint, jumping, stop, restart etc.) with a decisive influence on the outcome of the game (Reilly & Williams, 2003; Stolen et al., 2005). The aim of this research was to prove the impact of static stretching exercises applied during a recovery stage of training session (Cool- down) on agility performance of young soccer players (U13). Methods: In this study twenty young players U13 have participated (divided into an experimental and control group). They underwent initially and final measurements of body height, body weight and agility performance (Ajax test 5x10m and 20m zig-zag test with and without ball). Analyses of variance (ANOVA) calculated differences between arithmetic mean of each variable of control and experimental group before and after the experimental treatment (static stretching). Results: Univariate analysis of variance (ANOVA)

has shown that static stretching exercises applied at the end of the training session "cool- down" have had no statistically significant impact on agility in football players range 11-13 years. Discussion: Many researches confirmed that the static stretching exercises applied during the warm up have negative impact on speed and agility (Little & Williams, 2006; Haddad et al., 2014). In this research it has been proved that static stretching exercises applied 3 times per week during the cool down have not had statistically significant impact on the agility tests of U13 football players. Therefore, to young players we can recommend 1-2 times a week application of static stretching at the end of the training session, or special training sessions, in order to increase the optimal flexibility of the body as a prerequisite for executing the movements agility. References: Haddad, M., Dridi, A., Chtara, M., Chaouachi, A., Wong, P., Behm, D, & Chamari K. (2014). Static stretching can impair explosive performance for at least 24 hours. The journal of Strength & Conditioning Research, 28(1), 140-146. Little, T., & Williams, A. G. (2006). Effects of differential stretching protocols during warm-ups on high-speed motor capacities in professional soccer players. Journal of Strength and Conditioning Research, 20 (1), 203-207. Reilly, T., & Williams, A. M. (2003). Science and soccer (Second edition). Routledge,Taylor & Francis Group. Stolen, T., Chamari, K., Castanga, C., & Wilsloff, U. (2005). Physiology of soccer. J Sports Med., 35 (6), 501-536.

EXAMINATION OF AGE-RELATED CORE STABILITY AND DYNAMIC BALANCE IN HOCKEY PLAYERS.

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Introduction: Dynamic stabilization is the ability to maintain equilibrium during the transition from motion to a stationary position (Myer et al. 2006). Unlike dynamic stabilization dynamic balance is the capacity to maintain the center of mass over a fixed base of support under a movement challenge, for example, motion of other limbs and body segments (DiStefano et al., 2011). The Lower Quarter Y Balance test is a screen of dynamic balance (Smith, Chimera, Warren 2014) and the upper quarter Y-balance test assesses upper quarter mobility and stability (Westrick et al., 2012). Methods: The purpose of the study was to assess core stability and to determine age-related differences in the unilaterality of limb movements in hockey players. The sample included 152 hockey players aged 12 to 35 years. Every player performed the upper quarter and the lower quarter Y-balance tests. Performances of players showed high degree of individuality, which was expressed as the composite score. Results: The difference greater than 4 cm in movements performed by a left or right limb indicates imbalance and higher risk of injury. Of 152 players, 52 players showed a difference higher than 4 cm for the lower quarter (M = 5.5; SD = 1.1) and the upper quarter (M = 5.6; SD = 1.2), respectively. The U15 players (N=41) included the highest number of players (n=13) who showed high degree of imbalance between the right and left side of the body. Of 41 players, two players showed a difference greater than 4 cm. Another category at risk includes the senior players (N=41), 11 of which showed a difference greater than 4 cm. Discussion: Few investigations have examined the differences between child and adolescent-aged athletes on tasks that challenge postural control (Smith, Chimera, Warren 2014). For the development of ice hockey players, it is important to eliminate movement imbalance. The results have shown that the category at risk includes the U15 players, who may suffer from movement imbalance in the senior category. Thus, developmental maturity may affect balance control throughout childhood and adolescence (Breen et al., 2016). References: Breen EO, Howell DR, Stracciolini A, Dawkins C, Meehan WP (2016). Sports Health, 8(3), 244-249. Distefano LJ, Blackburn JT, Marshall SW, Guskiewicz KM, Garett WE, Padua DA (2011). Am J Sports Med, 39(5),

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TRAINING OF FORCE COMPONENTS AND SPEED RUNNING.

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Introduction: Continuous improvement of results in athletic sport and reaching high improvements in record results in almost all the races of athletic sport shows that at the same time the maximum limit evaluation of human performance are always relative and an important subject for further improvements (Verkhoshansky, 1966). In this review article we investigated and analyzed recent significant facts a) that bring scientific researchers about training experiences and the importance of strength, power, and speed and on their interaction between them, b) evidence of programs and rating training loads to show different performance relationships from time to time and compare these various program protocols. The impact of this study was to highlight a kinematic analysis about physical and functional performance by focusing more on the results of power and force in their relations with the speed running results. Methodology: To gather as much as possible scientific data we used "Jab Ref" as a research-sector focusing more in navigating on Medline, Google Scholar and Inspire options that this program contain. As selection-criteria of scientific articles we collected were these key words such as: strength, speed, power, training, correlations and loads. Results: Studies have shown that the relation between training of force components and speed running performance depends on the methodology used by muscular regimes (Delecluse, 1997). Force training program should be extended to all force components that have specific effects to running speed phases. The ratings loads of maximum force should start with a minimum of 70% of 1 RM to 100% of 1 RM. Maximum force should be trained by 1 RM (maximum repetition) (Chestnut & Docherty, 1999; Zatsiorsky, 1995). It is recommended that speed training exercises must involve bilateral leg muscle contractions by using vertical movement such as squats, depth jumps with or without weights which fit with the speed of muscle contraction running velocity (Warren, 2006); Harris et al.,2000). Also these recommendations due to maximum force development go on by using maximal intensity and less number of repetitions while for speed training it is recommended low intensity and numerous repetitions by using weighted ballistic exercises, depth jump and Olympic lift (Clark et al., 2008).

CONTRIBUTION OF LEG POWER TO AGILITY IN ADOLESCENT SOCCER PLAYERS.

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Introduction: Agility has been shown to be an important component of soccer play (Jovanovic et al., 2011). Despite the suggested importance of leg power for agility (Sheppard & Young, 2006) there haven't been many investigations of the relationships between reactive agility and leg power (Brughelli et al., 2008).

Therefore, this research investigates the interaction between leg power and agility in adolescent soccer players. Methods: A total of 75 young male soccer players (aged 14– 18 years) were recruited and tested for Squat jump (SJ), Counter-movement jump (CMJ) and counter-movement jump with arm movement (CMJAM) using force plate (Kistler, Quattro Jump) and for reactive agility tests (RAT). Running time was recorded using photocell gates (Microgate, Witty SEM lights). Pearson's correlation analysis was used to ascertain relationships between the jump and agility tests. Stepwise multiple regression analyses ($p \leq 0.05$) were also conducted to ascertain the measure of leg power that best predicted performance in the particular agility test. Results: The SJ significantly correlated with all agility variables ($p<0.001$; r=-0.37- -0.39). The strongest correlation for the reaction in live stimuli was found with the CMJ (r= -0.38, p=0.001). Linear regressions were conducted for each of the agility variable to determine the strongest power predictor. For each best predictive relationship, only one power variable for each speed test contributed to the significant regression. The most prominent leg power predictor was the SJ for most of the agility variables. Discussion: However, the strength of relationships between leg power and the agility tests differed depending on the stimuli for the reaction. Jones & Lorenzo (2013) found that SLJ, VJ and sprint were significant predictors of PRO agility test. However, one of the novel aspects of this study was the investigation of reactive agility, as measured by video or live stimuli. The results from the current study indicate that there are relationships between leg power, measured by SJ and CMJ and agility in adolescent soccer players. This results provide support to the need for vertical and reactive power within agility. Moreover, it provides strength and conditioning coaches with a greater understanding of vertical power, and whether to include an assessment of this capacity in testing for their athletes. References: Brughelli M, Cronin, Levin G, Chaouachi A (2008). Understanding change of direction ability in sport. Sports Med, 38(12), 1045-1063. Jones MT, Lorenzo DC (2013). Assessment of power, speed, and agility in athletic, preadolescent youth. J Sports Med Phys Fitness, 53(6), 693-700. Jovanovic M, Sporis G, Omrcen D, Fiorentini F (2011). Effects of speed, agility, quickness training method on power performance in elite soccer players. J Strength Cond Res, 25(5), 1285-1292. Sheppard JM, Young WB (2006). Agility literature review: classifications, training and testing. J Sports Sci, 24(9), 919-932.

DIFFERENCES IN MAXIMAL STRENGTH AND BODY VOLUMINOSITY IN RESISTANCE TRAINING DEPENDING ON CREATINE SUPPLEMENTATION.

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Introduction: The purpose of this study was to examine possible differences in maximal strength and body voluminosity after 8 weeks of resistance training depending on creatine supplementation in young male athletes. Methods: Fourteen male participants (22.3 ± 1.1 yr.) were randomly assigned into 2 groups: experimental group (CrM, N = 9), who consumed 20 g/day creatine (Cr) for 1 week and 5g/day Cr for 7 weeks, and control group (K, N = 5). Training protocol has been set at 80 – 95% of 1 repetition maximum (1RM), in 4 sets, range of 8 – 12 repetition, 4 days/week. Multivariate analysis of variate (MANOVA) was used to determine differences in variable system, and univariate analysis of variate (ANOVA) was used to determine individual differences among variables. Results: There was significant difference between CrM and K group in system variable for maximal strength in favor of CrM group ($p<0.05$), and in individual variables: 1RM bench press ($p<0.05$) and 1RM squat ($p<0.01$). Also, there was significant difference between CrM and K group in system variable for body voluminosity in favor of CrM group

($p<0.01$), and in individual variables: upper leg circumference ($p<0.05$), flexed upper arm circumference ($p<0.01$), abdominal skin fold thickness ($p<0.01$) and m. triceps brachii skin fold thickness ($p<0.01$). Discussion: These findings identify with research of Noonan et all. (1998), Volek et all. (1999) and Peeters et all. (1999) when 1RM results are considered. Results of body voluminosity, on the other hand, found similarity with results of Willougby et all. (2001), Volek et all. (2003). These findings support and confirm results of this study, that creatine supplementation with resistance training will enhance muscle strength and body voluminosity in young male athletes. References: Noonan, D., Berg, K., Latin, R. W., Wagner, J. C., & Reimers, K. (1998). Effects of varying dosages of oral creatine relative to fat free body mass on strength and body composition. Journal of Strength and Conditioning Research, 104-108. Peeters, B. M., Lantz, C. D., & Mayhew, J. L. (1999). Effects of oral creatine monohydrate and creatine phosphate supplementation on maximal strength indices, body composition and blood pressure. Journal of Strength and Conditioning Research, 3-9. Volek, J. S., Duncan, N. D., Mazzetti, S. A., Staron, R. S., Putukian, M., Gomez, A. L., et al. (1999). Performance and muscle fiber adaptations to creatine supplementation and heavy resistance training. Medicine & Science in Sport & Exercise, 1147-1156. Willoughby, S. D., & Rosene, J. (2001). Effects of oral creatine and resistance training on myosin heavy chain expression. Medicine and Science in Sports and Exercise, 1674-1681.

EFFECTS OF LEUCINE SUPPLEMENTATION ON BODY COMPOSITION DURING EIGHT WEEKS OF RESISTANCE TRAINING.

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Introduction: Resistance training has been shown to improve body composition (Willoughby et al., 2007) however, oral consumption leucine during resistance training leads to greater improvements body compositon than resistance training alone (Colker, Swain, Fabrucini, Shi & Kaiman, 2000). Authors (Wilkinson et al., 2013) have been reported to increase the muscle protein synthesis in young subjects when consumed 4-5 g leucine supplementation. The aim of this study was to determine effects of leucine supplementation on body composition during 8 weeks of resistance training. Methods: Ten young adults male (23 ± 6) were randomly assigned to leucine group (LEU, 5g every day, n=5) or control (K, resistance training n=5). Body composition was assessed by Bioimpedance Maltron Bioscan 920 – 2. Data was analyzed with multivariate analysis of covariance (MANCOVA). Results: There was significant difference between LEU and K group in system varible of body comopsition ($p<0.01$). LEU group achieved greater improvement in muscle mass (kg) than K group ($p<0.01$). Also, LEU group achieved a significan decrease ($p<0.01$) in fat mass (%), andominal skin fold thickness (mm) and waist size (cm) compared K group ($p<0.01$). Discussion: The major findings of this study were that eight weeks of resistance training with leucine supplementation cause large improvements in body composition than resistance training alone. However, contradictory results are obtained Aguiar et al., (2017). Authors showed that no additional effect of leucine supplementation (3g/day) on muscle mass compared with the resistance training alone (Aguiar et al., 2017). Defference between results in these studes can be found in amount of consumed leucine, resistance training program, daily nutrition and in participants. References: Aguiar, A. F., Grala, A. P., da Silva, R. A., Soares-Caldeira, L. F., Pacagnelli, F. L, Ribeiro, A. S., da Silva, D. K., de Andrade, W. B., & Balvedi, M. C. W. (2017). Free leucine supplementation during an 8-week resistance training program does not increase muscle mass and strength in untrained young adults subjects. Amino Acids, 49(7), 1255-1262. Colker, C., Swain, M., Fabrucini, B., Shi, Q., & Kaiman, D. (2000). Effects of supplemental

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Workshops

Workshop 1

LATERALIZATION IN SPORTS: How to measure?

In many sports, including both coactive and interactive sports, lateralization is one of the important factors that can be either improve or worsen the performance of the athletes (Loffing, Hagemann, Strauss, & MacMahon, 2016). The researches related to this topic go back to the late 18th centuries. If an athlete can use both sides of his or her body parts, the probability to be successful in his or her sport increases. Thus, trainers or coaches most of the time look for the athletes who have this ability to apply to the certain skills. In this respect, recent focus of the researches in the motor learning, motor control, neuroscience, sport and cognitive psychology areas has been become very popular. The problem with those studies, however, sometimes arises with "how to measure laterality?". In fact, researchers many years used the questionnaires to test handedness or footedness. However, it has been realized that we need to use some quantitative data to describe and discuss the effect of lateralization in sports. Some studies use virtual reality environments (Sainburg, Ghez, & Kalakanis, 1999; Akpinar, Sainburg, Kirazci, & Przybyla, 2015) to test performance asymmetries in arm coordinations using electromagnetic sensors. Some researchers use balance tools (Sarabon & Omejec, 2007) surface electromyography (Mutha, Boulinguez, & Sainburg, 2008), force plates (Sarabon, 2011), and custom-made products (www.s2p.si). Moreover, there are also plenty of other products that can be used to measure the performance of the motor asymmetry in different skills. The aforementioned ones are mainly used for talent identification, performance progress, and rehabilitation. However, trainers or coaches need to also apply sport specific skill tests for each side of the body part to observe the efficiency of the skill improvement. Therefore, bilateral training may be helpful to counteract the asymmetry of the performance in many sports. In conclusion, depending on the aim of the trainer or coach and athletes, different kind of equipment needs to be used for talent identification, performance progress, rehabilitation, and skill improvement. In this workshop, I will try to address the measurement issue in lateralization in sports with many examples.

Dr. Selçuk Akpinar is currently employed at Nevsehir Haci Bektas Veli University, Turkey. His background is in sports science but he improved his knowledge in motor control and behavior during his PhD and later on during his Post-doc. His area of interests includes motor lateralization in sports, motor learning, anthropometric measurements, and perceptual motor skill assessments. He spent 1,5 years at Penn State University during his PhD at Department of Kinesiology in Prof Sainburg Lab where he also worked as a Post-doc for 6 months later on. He tries to investigate the effect of long-term training in different types of sports on motor lateralization. Currently, he also works on the effect of physical activity on motor performance of disabled people from different age. He has many papers in respected journals and more than 100 citations to those papers.

Workshop 2

"PROJECT MANAGEMENT – METHODS AND APPROACHES" – FROM IDEA TO REALISATION

The sustainability of every organization or project is highly influenced by our internal needs for changes. Successful changes depend on the level of creativity, flexibility, desire for adaptation, realization of ideas and competences necessary for the conduct of the entire process. "The notion managing derives from a word "manage" and resembles providing a direction, organization of a process of work and leading work connected to biological, technical, organizational and other systems"

The fundamental question that we pose to ourselves is "What do we wish to achieve? How do we reach our goal? What instruments do we have to use?" The approach to Project Management by means of utilizing the basic managerial tools provides us the security for quality work. A strategic approach to Project Management is the essence for a successful realization of desired goals.

"The original sin is to limit the Is. Don't." Richard Bach

Today, New Sport World is based on project development, defined with different funding possibilities and in accordance with trends, criteria, priorities and needs of continents, regions and countries. Establishing of networks for better project and synergies is in great need, and necessary and most important for future success and joint approach. This Workshop is designed to support all participants to exchange their experience in the Sport Management Projects in their respective countries or regions. During Workshop all participants will have opportunity to present their activities in the frame of available project funds. This is opportunity to see possibilities for creating possibilities for appropriate synergies in sport projects. Available fund for Project development are different from the regions to the regions and there is need to have overall picture about possibilities as basis for future cooperation. Workshop is to support and improving relations, as well as providing actions for cooperation for development. To achieve this goal we expect active participation in presenting projects, experiences and ideas. Delegates will be asked to full fill form with short info about organization, projects they have experienced, project they would like to develop as well as available project funds. The Workshop will take the form of a "Corner Meetings", participants will be able to choose partners and create networks in accordance with their interest.

Dr. Dino Mujkic has over 20 years working in International Projects and over 17 years of experience in reforms of higher education and innovation systems in South Eastern Europe (SEE) and Eastern Europe countries. He holds a track record of more than 70 projects, funded by Austrian Development Agency, European Union, private foundation, companies, ministries and others, implemented in close cooperation with governmental institutions, NGOs and other main stakeholders. His key skills lie in policy and strategy development, institutional and capacity building, research, consulting, internal and external evaluation processes, development of method principles and instruments in the field of Higher Education, Sport and Culture. As a Regional Manager and Associate Board Member of WUS Austria, Assistant Professor at the University of Sarajevo and Founder and President of the Board of Sarajevo Meeting of Cultures, he possesses an excellent network in the SEE, EE and the EU. Dino Mujkic earned a PhD in Sport and is currently teaching at the Sport Management department, University of Sarajevo, covering courses such as Strategies in Sport, Style of Management, Mission and Values in Sport, Management in Sport Recreation, Globalisation, Human Resource Management.

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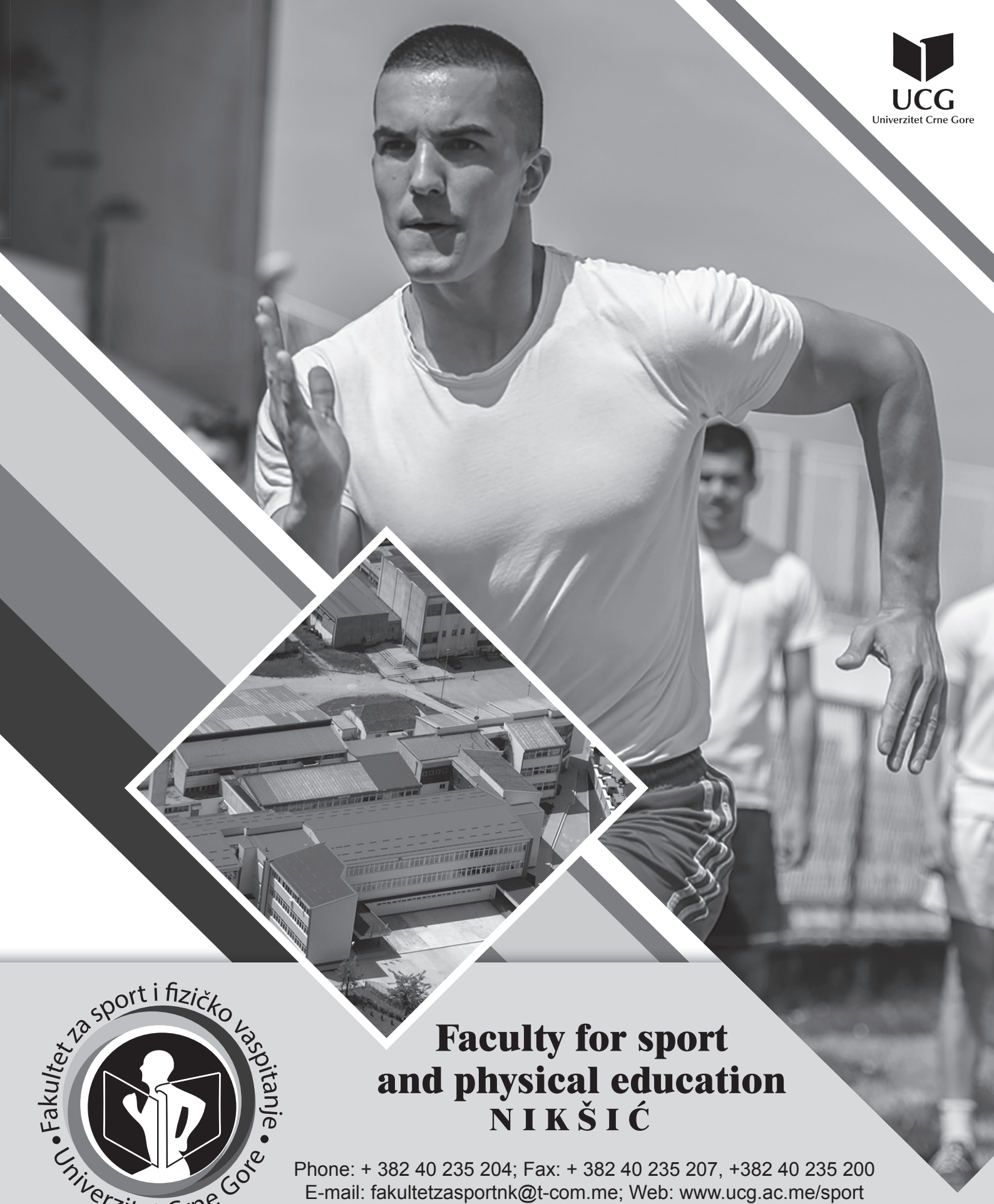

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