CRNOGORSKA SPORTSKA AKADEMIJA • MONTENEGRIN SPORTS ACADEMY •

MSA PODGORICA 2016

MSA Conference 2016

13th International Scientific Conference on

Transformation Processes in Sport

SPORT PERFORMANCE

BOOK OF ABSTRACTS

31st March - 2nd April 2016, Podgorica - Montenegro

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13th International Scientific Conference
on Transformation Process in Sport "Sport Performance"

MONTENEGRIN SPORTS ACADEMY

31st March – 2nd April 2016, Podgorica – Montenegro

BOOK OF ABSTRACTS

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Bjelica, D., Popovic, S., Akpinar, S.

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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 Podgorica, a gorgeous city at the crossroads of several historically important routes, as the host city of the 13th 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 31 March to 2 April, 2016.

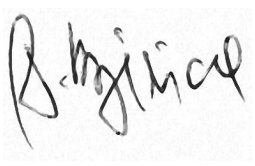
Since the first event in Bar in 2003, the MSA Conference has been a huge success, providing a great opportunity to promote and develop Sports Sciences through networking, study and research. This year, under the traditional patronage of the Ministry of Science and the Ministry of Education and in collaboration with Faculty of Sport and Physical Education at University of Montenegro as well as Faculty of Sport and Physical Education at University of Novi Sad, Department of Physical Education and Sport at Nevşehir Hacı Bektaş Veli University, Society of Sport Sciences from Turkey 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 Podgorica. 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.

Podgorica 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 Podgorica!

Prof. Duško Bjelica, PhD
Conference President



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Plenary Presentations

MITOCHONDRIA: A RE-DISCOVERED TARGET FOR EXERCISE AND NUTRITION INTERVENTIONS.

Ostojić, SM.[1,2]
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Introduction: Mitochondrion has been recognized as a key organelle in several cellular processes, including cellular bioenergetics and reactive oxidative species production. Balanced mitochondrial activity enables even-tempered oxidative phosphorylation, heme biosynthesis, modulation of Ca2+ fluxes, redox signaling, and control of stress responses, while dysfunctional mitochondria might negatively affect cellular viability (Smith et al., 2012). Discussion: Mitochondrial dysfunction accompanies many diseases and conditions, such as neuromuscular and neurodegenerative disorders, cardio-metabolic diseases, cancer and aging (Bernal-Mizrachi & Clay Semenkovich, 2006). Specifically, exhaustive exercise might induce mitochondrial dysfunction, with increased autophagy, mitochondrial fission, and decreased peroxisome proliferator-activated receptor-gamma co-activator 1 alpha, a key regulator of energy metabolism (Feng et al., 2011). Therefore, mitigating mitochondrial abnormalities might contribute to attenuating the severity and development of mitochondrial dysfunction. In particular, mitochondrial dysfunction has been identified as a therapeutic target for inadequate exercise tolerance and/or recovery, with different mitochondria-directed strategies (e.g. pharmacological, nutritional, medical) have been proposed to prevent or manage mitochondrial disturbances (Ostojic, 2015). Here, we overview the effects of mitochondria-targeted nutritional and exercise interventions in both acute (e.g. exhaustive exercise, inflammation, injury) and chronic mitochondrial disorders (e.g. obesity, chronic fatigue syndrome, neurodegenerative diseases). References: Bernal-Mizrachi C, Semenkovich CF (2006). Nat Med, 12(1), 46-47. Feng Z, Bai L, Yan J, Li Y, Shen W, Wang Y, Wertz K, Weber P, Zhang Y, Chen Y, Liu J (2011). Free Radic Biol Med, 50(10), 1437-1446. Ostojic SM (2015). Pharmacol Res, 94(4), 51-53. Smith RA, Hartley RC, Cochemé HM, Murphy MP (2012) Trends Pharmacol Sci, 33(6), 341-352.

CURRENT INSIGHTS ON IRON METABOSLIM AND ENDURANCE SPORTS.

Zhang, Y.[1]
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Introduction: This tutorial will provide a critical review and analysis of the current state of knowledge about the relationships between iron metabolism, health, endurance sports, and exercise performance. Discussion: Iron is necessary for physiological processes essential for sports performance, such as oxygen transport, energy production, and cell division. Endurance athletes are at increased risk for suboptimal iron status, with potential negative consequences on performance, because of the combination of increased iron needs and inadequate dietary intake (Zourdos et al., 2015). A number of strides have been made in the last 20 years that have greatly expanded our appreciation of the role of the

iron for hemoglobin synthesis, the tight link between erythropoiesis and iron metabolism, and in adapting to training (Buratti P et al., 2015; Hinton, 2014;). The goal of this talk is to 1) describe how hepcidin regulates systemic iron homeostasis, 2) summarize the effects of iron deficiency on endurance athletes, and the putative physiological underpinnings for such effects, 3) review how iron supplementation have been used to treat exercise-induced iron deficiency in endurance athletes, and 4) describe current cutting-edge uses of supervised iron supplementation to affect hemoglobin synthesis that facilitate an improvement in endurance exercise capacity. This tutorial should appeal to a broad audience from basic scientists, to coaches to those with applied interests who are interested in understanding the iron metabolism for adaptions to high performance sports.References: Buratti P, Gammella E, Rybinska I, Cairo G, Recalcati S (2015). Med Sci Sports Exerc, 47(8), 1596-1604. Hinton PS (2014). Appl Physiol Nutr Metab, 39(9), 1012-1018. Zourdos MC, Sanchez-Gonzales MA, Mahoney SE (2015). J Strength Cond Res, 29(2), 559-565.

HOW DOES PHYSICAL ACTIVITY AFFECT ACADEMIC PERFORMANCE AND POSITIVE ATTITUDE?

Demirhan, G.[1]
[1] *Hacettepe University (Ankara, Turkey)*

Introduction: Schools support the integrative development of the children and young adults and they are places that provide the opportunity of being active for many children and young people before and after the classes and during the breaks and in Physical Education and Sports Classes (Coe et al., 2006; Kibbe et al., 2011). In this context, the purpose of the presentation is to examine the effect of physical activities on academic performance and positive attitude toward physical activities. Method: Some research results which have been done by Demirhan et. al. and other researchers will be presented and discussed in this content. Results and Discussion: Many previously conducted studies demonstrated that all forms of physical activity –from physical education to passive exercise –have a positive effect on academic performance of the children, and on the development of cognitive performance. Reliable results from other studies also indicated that physical activity has no negative effect on academic and cognitive performance of children (Tomporowski et. Al., 2008). Furthermore, individuals who regularly participate in these physical activities will, in time, begin to display increasingly more favorable attitudes toward them. According to the research results conducted by Koca and Demirhan (2004) and Hünük and Demirhan (2010), children who regularly do sport and take part in physical activities have higher attitudes scores toward physical education and sport. According to the results of Tomik's (2007) study, children who are members of sport club have comparatively higher attitude scores toward physical activity and sports. In this respect; "Families! Do not fear! Physical activity does not decrease academic performance and positive attitude". References: Coe D P, Pivarnik JM, Womack CJ, Reeves MJ & Malina RM (2006). Med Sci Sports Exerc, 38(8), 1515. Hünük D & Demirhan G (2010). Perceptual and Motor Skils, 111, 324-332. Kibbe DL, Hackett J, Hurley M, McFarland A, Schubert KG, Schultz A & Harris S (2011). Prev Med, 52 Suppl 1, S43-50. Koca C & Demirhan G (2004). Perceptual and Motor Skills, 98, 754-758. Tomik R (2008). Human Movement, 9(2), 142-150..Tomporowski PD, Davis CL, Miller PH & Naglieri JA (2008). Educational Psychology Review, 20(2), 111-131.

THE IMPORTANCE OF THE FOOT MUSCLE FUNCTIONS IN PHYSICAL PERFORMANCE.

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Introduction: Muscle strength is remarkably important in various stages of physical growth and prevention against premature death. The force produced during the movements is transmitted from the hip, knee, ankle to toe joints. In order to understand regulatory mechanisms of human locomotion, a better understanding of the force transfer system of lower limb is needed. Discussion: Because the foot is the only body parts that contact the ground during locomotion, it is a key to understand how the muscle function of the foot relates the dynamic lower-limb muscle function. The foot muscles are a unit that produces force for postural control during the locomotion. Muscles of the foot generate force during the ground contact phase of human locomotion as the metatarsophalangeal joints is dorsiflexed. To better understand the specific roles of the muscle strength and arch height of the foot, it should be useful to consider how these indices of the foot in the standing condition are related to different types of physical performance of the lower limbs. In this presentation, I will show our recent studies about the importance of the muscle strength and arch height of the foot, and the relationships between these indices and different types of physical performance involving the lower limbs. References: Yamauchi J, Kurihara T, Yoshikawa M, Taguchi S and Hashimoto T. (2015). SpringerPlus, 4, 402. Otsuka M, Yamauchi J, Kurihara T, Morita N and Isaka T. (2015). Gazzetta Medica Italiana Archivio per le Scienze Mediche, 174, 307-313. Yamauchi J and Koyama K. (2015). International Journal of Sports Medicine, 36, 592-595. Chatchawan U, Eungpinichpong W, Plandee P and Yamauchi J. (2015). Medical Science Monitor Basic Research, 21, 68-75. Morita N, Yamauchi J, Kurihara T, Fukuoka R, Otsuka M, Okuda T, Ishizawa N, Nakajima T, Nakamichi R, Matsuno S, Kamiie S, Shide N, Kambayashi I and Shinkaiya H. (2015). Medicine & Science in Sports & Exercise, 47, 350-356. Kurihara T, Yamauchi J, Otsuka M, Tottori N, Hashimoto T and Isaka T. (2014). Journal of Foot and Ankle Research, 7, 26. Koyama K, Kato K and Yamauchi J. (2014). Journal of Strength and Conditioning Research, 28, 1411-1417.

MUSCLE INJURIES IN FOOTBALL: CLASSIFICATIONS, EPIDEMIOLOGY AND RISK FACTORS.

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Introduction: Muscle injury is one of the major problems facing football players. They constitute up to 37% of all time-loss injuries at men's professional level (Ekstrand et al. 2011). Hence, prevention of muscle injuries is of ultimate importance in football. Despite significant efforts being placed on prevention, the incidence of muscle injuries in professional football in the last decade is increasing (Ekstrand et al. 2016). Here I discuss several relevant issues related to muscle injuries in football: (1) types of muscle injuries, epidemiology of muscle injuries, and the associated intrinsic and extrinsic risk factors. Methods: Narrative review of literature related to classification, epidemiology, and risk factors of muscle injuries in men's football was performed. Results and Discussion: Regarding classification of muscle injuries, it should be noted that they represent a heterogeneous group of different injury types

and somewhat diffuse terminology (Ekstrand et al. 2011). This complicates prevention and management of muscle injuries in sport. I discuss here several recently proposed muscle classification systems, with particular reference to their practical utility. Regarding epidemiology, the latest experimental data (Ekstrand et al. 2011) suggest that muscle injuries indicate that they constitute almost one third of all time-loss injuries in men's professional football, and 92% of all injuries affect the 4 big muscle groups in the lower limbs: hamstrings (37%), adductors (23%), quadriceps (19%), and calf muscles (13%). Sixteen percent of the muscle injuries were reinjuries. Finally, regarding risk factors, recent evidence suggest that specific muscle function (Timmins et al. 2015) and players' training load (Gabbett, 2016) could be the most relevant risk factors for muscle injuries in football. Hence, prevention of muscle injuries in football should include monitoring of specific muscle function and players' training load in daily practice.
References: Ekstrand J, Waldén M, Hägglund M. (2016). Br J Sports Med., pii: bjsports-2015-095359. doi: 10.1136/bjsports-2015-095359. Ekstrand J, Hägglund M, Waldén M. Epidemiology of muscle injuries in professional football (soccer). (2011). Am J Sports Med., 39(6):1226-32. Gabbett TJ. (2016). Br J Sports Med. 2016 Jan 12. pii: bjsports-2015-095788. doi: 10.1136/bjsports-2015-095788. Timmins RG, Bourne MN, Shield AJ, Williams MD, Lorenzen C, Opar DA. (2015). Br J Sports Med., pii: bjsports-2015-095362. doi: 10.1136/bjsports-2015-095362.

Oral Presentations

Architecture and Urbanism

PLANNING NETWORK OF SPORTS FACILITIES IN A CONTEXT OF MONTENEGRO. CASE STUDY: HERCEG-NOVI, PODGORICA AND DANILOVGRAD.

Popović, G.S.[1], **Bajic Sestovic, J.**[1], **Vlahović, S.**[1], **Đurović Mašanović, N.**[1]
[1] *University of Montenegro (Podgorica, Montenegro)*

Introduction: The land intended for sport and recreation are areas which are in the planning document designed to develop sports and recreational facilities, outdoors or indoors. Positions of sports facilities in the urban matrix of town, are significantly generating urban processes, and therefore the city's urban development. Globalisation and the transition effects in Montenegro contributed faster transformation of society. The large gap between inherited values of the space and the new trends of modern life and coordination with global trends are creating new forms of urban spaces and new relations between the population and the area provided for the sport and recreation. The modern inhabitant of the town is devoting less time for sports activities, and how mens sana in corupre sano, therefor the healing of the city we should seek through the strengthening of the network of sports and recreational zones in the city. Method: The method of research conducted in this work is based on specific indicators and analysis. All these indicators accompanied by appropriate algorithmic vector and transformational processes that give the network structure of sports facilities. with setting priorities composition of urban networks. Results: The aim of this paper is to determine whether the existing network of sports facilities in Herceg-Novi, Danilovgrad and Podgorica can meet the needs of the residents, as well as to provide recommendations for the further development of the network of sports facilities. Discussion: This paper explores the urban parameters for the planning of sports and recreational zones in the city. During the transition period, the last 25 years, the system of planning and land management has experienced a major transformation in terms improper planning development of sports facilities, not supporting sports and recreation needs of the residents. For central and coastal region of Montenegro, it is characteristic rapid urbanization with significant migration and dominant construction of residential blocks and tourist facilities on the coast. The planning area for residential, has not been accompanied by adequate network of sports facilities. References: Sports facilities in Montenegro (state and bonitet). (1996). Podgorica. Popović, GS. (2014). Urban Parameters for Planning the Network of Physical Education Facilities in Montenegro, Sport Mont 40-42/XII. Korušnjak, B. (2015). Razvoj mreže sportske infrastructure u Hrvatskoj na primjeru Zagreba. Yagreb, Arhitektonski fakultet Sveučilišta u Zagrebu.

SUSTAINABILITY OF PUBLIC SPORTS FACILITIES IN THE CASE OF SEVERAL SPORTS HALLS IN CROATIA.

Koruznjak, B.[1]
[1] *University of Zagreb (Zagreb, Croatia)*

Introduction: Sports facilities are the basic assumption and the most visible part of every sports activity. With its position, formatting, construction technology, used materials and processes of action and use, they are important element in the impact on the environmental sustainability as well as energy efficiency. The principles of sustainability and environmental protection in/with sports (Earth Charter) among others include the careful planning, design, construction and management of sports infrastructure. Method: Comparative analysis of several specific sports halls in Croatia based on a critical review of the project programs, urban, economic and environmental indicators on the reality of purpose and capacity, with consideration of possibility of investors staffing and financial resources in optimal management shows all the disproportion in the application of the principles of sustainability. Results: It is suggested, with the application of the required legislation (standards – yesterday, nowadays, tomorrow), multidisciplinary-integrated approach to planning (development studies – Sport and Territory, Sport and Health, Sport and Education, Sport and Nature, Sport and Renewal of Society, Sport and City), design and implementation of sports infrastructure on the principles of sustainable development (costs in correlation with the material, time and energy while increasing safety and quality). Discussion: Sustainability and (or) consideration is the principle of action in environmental protection. The criteria of sustainability of public sports facilities assume the following: easy adaptability to diverse sports, cultural, shows and similar requirements with rapid and effective transformation of the venues; ability of floor covering that permanently fulfills various sports and other requirements with minimal maintenance cost; setting of ''healthy'' materials which can be recycled – so-called 3 E: ecological, economic and aesthetically acceptable; programming – designating purpose and content of basic functions, defining the location-site and capacity in the initial stage already should contain ''cost benefit'' analysis and forecasting all costs (planning, project documentation, construction, maintenance and usage, technology renewal, etc...) for the entire programmed lifespan of such building. References: Koružnjak, B. (2006). Analiza prostornih standarda znanstveno-nastavnih ustanova Sveučilišta u Zagrebu, Zagreb. sb, zeitschrift der IAKS, 6/2009., Mehrzwecksporthalle ''Gradski vrt'' u Osijeku, 40 – 45. 3nd INTERNATIONAL SEMINAR, ''Transfer of Knowledge on Sports Infrastructure in Transition Countries'' – Koružnjak, B.,Sustainable Outdoor Sport Facilities, Zagreb, 2012. Strategija razvoja sporta i tjelesnog vježbanja na Sveučilištu u Zagrebu (2011.-2020.), Jukić I., Delić D., Koružnjak B., Zagreb 2012.

Biomechanics

FORCE EFFECTIVENESS DURING CYCLING: THE EFFECT OF THE MEDIAL-LATERAL FORCE COMPONENT.

Fonda, B.[1,2], **Šarabon, N.**[1,2]
[1] *University of Primorska, Andrej Marusic Institue (Koper, Slovenia),* [2] *S2P, Science to Practice, Ltd., Laboratory for Motor Control and Motor Behaviour (Ljubljana, Slovenia)*

Introduction: Body movement during cycling is a cyclic motion, which predominantly happens in the sagittal plane. It is also constrained to the pedal/crank path around the bottom bracket. These

constraints limit cyclists to optimise the pedalling technique by applying the force in two directions, vertically and in anterior-posterior direction. Any medial-lateral force (FML) applied to the pedals is considered as a waste and does not contribute to the pedalling. Our work with elite cyclists and research conducted in our lab revealed that there is a certain amount of force that is exerted in the medial-lateral direction. The aim of this study was to examine how FML affects force effectiveness calculations and how workload and cadence affect the FMF component. Methods: 22 cyclists (24 ± 4.8 years, 74.3 ± 11.8 kg and 177.5 ± 5.9 cm) completed 6 testing trials using their own bicycle at 3 different workloads (2, 2.5 and 3 W/kg) and 3 different cadences (75, 85, 95 rpm). During each trial, 3D forces were recorded from the force pedal (Cycling Science, Ltd.) mounted to the left side. Force effectiveness was assessed first by using all 3 force components and second by neglecting the FML component. Relative FML was expressed as the percentage of the maximal value of the total force. Moreover, the root mean square of the relative FML and absolute FML was calculated. Results: Index of effectiveness was significantly lower and total force was significantly higher ($p < .05$) under all conditions when the FML component was included in the calculations. Absolute FML was significantly different at different cadences and workloads. There was no significant difference in relative FML across the three cadences. However, there was a significant difference in relative FML at different workloads. Discussion: The aim of this study was to test the hypotheses that 1) the total force and index of effectiveness will be significantly different when including the FML component and 2) the FML will differ at different workloads and cadences. The results of the present study confirm the hypotheses and demonstrate the importance of the FMF in the calculations of the total force applied to the pedals and consequently the index of effectiveness. This challenges the vast majority of the biomechanical studies that examined force effectiveness by neglecting the FML component (Bini et al. 2014). Future research should use technology that allows measuring forces in 3D space. References: Bini RR, Diefenthaeler F, Carpes F (2014) Int Sport J, 15(1), 96–112.

Health and Fitness

RELATION OF AGE AT MENARCHE TO PHYSICAL ACTIVITY.

Peja, E.[1], **Tase, E.**[1]
[1] *Sports University of Tirana (Tirana, Albania)*

Introduction: Due to remarkable lifestyle changes, during the last decade, there has been a marked increase in the number of Albanian girls of all ages undertaking physical activity at both competitive and recreational levels, but updated studies on their average age at menarche are lacking. The age at menarche is clinically valuable, since it may have important health implications in later life. The aim of this study is to determine whether regular physical activity during early puberty is influential in preventing early menarche. Methods : This cross sectional study was carried out on 102 post-menarcheal girls aged 11 – 20 (14.79 ± 0.33). 51 of them were already engaged in competitive sport activities prior to the onset of menstruation (group 1), while the others got engaged in such activities after the onset of menstruation (group 2). All participants provided the year and the month of their first menstrual period. First, we estimated the equality of dispersion between the two groups, by conducting Two Samples for Variances F-test. Second, because no homogeneity of variances between groups was found, they were compared by using Two Samples Assuming Unequal Variances t-test. The difference between groups is statistically significant, as the t statistics (= 2.883) is greater than both critical t statistics (one-tail =

1.664 two-tail = 1.990) and the p value less than 0,05 in both cases (one-tail = 0.002 two-tail = 0.005). Results: None of the girls in the first group starts to menstruate before 11 years of age and 90% of them are menstruating by age 14, with a median age of 12.95 ± 0.35 years. Age of menarche is lower in the second group with a median age of 12.25 ± 0.31 years, thus approximately 8 months lower than median age for the first group. 11.76% of the girls in the second group start to menstruate before 11 years of age and 90% of them are menstruating by age 13. Discussion: It is rather, the decline in early matures among those engaged in regular physical activity prior to the onset of menses, that makes the statistically significant correlation between physical activity and age at menarche practically meaningful. Relatively early matures (< 11 years) have been found to be slightly shorter but up to 5.5 kg heavier in adulthood than are late matures (van Lenthe et al. 1996; Biro FM, 2001; Garn SM et al, 1986). In addition, a relatively young age at menarche has been associated with an increased risk for breast cancer (Petridou et al. 1996; Titus-Ernstoff 1998) and spontaneous abortion (Liestol et al., 1980). References: Biro FM et al. (2001). J Pediatr. 138:636–643. Garn SM et al. (1986). Am J Clin Nutr. 43:879–883. Liestol K. (1980). Am J Epidemiol. 111:753–758. Petridou E et al. (1996). Int J Cancer. 68:193–198. Titus-Ernstoff L et al. (1998). Cancer Epidemiol Biomarkers Prev. 7:783–789. Van Lenthe FJ et al. (1996). Am J Clin Nutr. 64:18–24.

BARRIERS TO PHYSICAL ACTIVITY AND HEALTHY EATING AMONG PRESCHOOLERS.

Mehmeti, I.[1]
[1] *University of Montenegro (Niksic, Montenegro)*

Introduction: This qualitative study aimed to investigate educators' and parents' opinions on barriers to physical activity (PA) and healthy eating habits of preschoolers. Through separate, independent focus groups, they expressed their opinions and perceptions on children's current physical activity and healthy eating habits. Methods: In total, eighteen focus groups with 108 parents were conducted between April- May 2015, in central and north part of Kosovo. Results: Parents perceived preschoolers as not sufficiently active; they argue that; 'play must be present on daily basis in children's school life: Discussion: PE curricula for preschoolers should include activities which are fun and engaging for the kids. The school must build positive attitudes and a disposition towards PA and healthy eating habits. Developing strong relationships between school and families has a positive impact on young children's learning and development, both within school settings and the home environment. The awareness of parents needs to be raised concerning their shared responsibility about level of engagement in school and home based PA, and healthy eating behaviours in preschoolers. References: Hill JO, Wyatt HR, Reed GW, Peters JC: Obesity and the environment: where do we go from here? Science 2003, 299(5608):853–855. Oliver M, Schofield GM, Kolt GS: Physical activity in preschoolers: understanding prevalence and measurement issues. Sports Med 2007, 37(12):1045–1070. Pate RR, McIver K, Dowda M, Brown WH, Addy C: Directly observed physical activity levels in preschool children. J Sch Health 2008, 78(8):438–444.

NEUROMUSCULAR AND COGNITIVE CHANGES IN ADULTS WITH SEVERE COGNITIVE IMPAIRMENT AFTER 12 WEEKS OF MULTICOMPONENT TRAINING.

Blasco-Lafarga, C.[1], **Sanchis-Sanchis, R.**[1], **Pedrosa, B.**[2], **Cordellat, A.**[1], **Montoya-Vieco, A.**[1], **Sánchez-Santacruz, P.**[1], **Javaloyes, V.**[1], **Almonacid, M.**[1], **Pasqual, B.**[1], **Sanchis-Soler, G.**[1]
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Introduction: Although research is still inconclusive, due to its low statistical power, Aerobic and Resistance Training programs point to psychophysiological and cognitive improvements in elderly people with severe cognitive impairment (SCI); with less effect attributed to Multicomponent Training (MCT) where only Taichi has shown significant effects (Bherer et al., 2013; Gates et al., 2013). Recently, a MCT program called "EFAM-UV" has shown to be effective for cognitive and functional enhancement in healthy adults (Martinez-Navarro, 2014). We aim to verify now whether 12 weeks of this program are enough to achieve functional and cognitive improvements in SCI elderlies. Methods: 11 SCI old adults from the Cuadernos Rubio Fundation (73.91±9.58 y; 5 males and 6 females with MCI and AD) participated in 12 weeks of the EFAM-UV program, a Functional and Cognitive MCT program based in the Dual-task and Enriched Environment methodology. Pre and post 30-seconds Chair-Stand Test (30CST); 8-foot Up&Go Test (8f-TUG); Mini–Mental State Examination (MMSE), and Short Form 12 Health Survey (SF-12) were tested for Strength, Agility, Cognitive impairment and Health status evaluation. Results: Wilcoxon pre-post mean comparisons showed significant differences in lower limb strength (30CST, p=0.011; 9.00±3.13 vs 11.00±3.00), agility (8f-TUG, p=0.021; 10.04±3.64 vs 8.84±3.07 s), and cognitive impairment (MMSE, p=0.034; 20.55±6.86 vs 23.00±5.92) while the light improvement in SF-12 (68.91±15.76 vs 71.27±15.18) was not significant. Discussion: Although MCT programs have some difficulties regarding the use of high intensities and large physiological exertions, a Functional and Cognitive MCT program combining Dual-task and Enriched Environments has shown to be a good strategy to improve functional and cognitive outcomes at short term in elderly SCI. This is similar to other studies with low fitness or frail elderlies (Blasco-Lafarga et al., 2014; Cadore et al., 2013). Further research may elucidate if this short MCT interventions might become a physical- conditioning starting point before any long-term exercise intervention, or if longer training periods will be able to improve also the health status in SCI Elderlies. References: Bherer, L., Erickson, K. I., & Liu-Ambrose, T. (2013). J. Aging Res. Blasco-Lafarga, C., Sanchis-Sanchis, R., Sanchis-Soler, G., & LLorens, P. (2014). Proceedings of The Physiological Society. Cadore, E. L., Rodríguez-Mañas, L., Sinclair, A., & Izquierdo, M. (2013). Rejuvenation research, 16(2), 105-114. Gates, N., Singh, M. A. F., Sachdev, P. S., & Valenzuela, M. (2013). Am J Geriatr Psychiatry, 21(11), 1086-1097. Martínez-Navarro, I. (2014). PhD thesis. Universidad de Valencia, Valencia (Spain).

RESISTANCE TRAINING FOR HEALTH AND FITNESS.

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Introduction: Muscular fatigue can be achieved by performing fewer repetitions with heavier weight, or by performing more repetitions with relatively less weight. Benefits of Resistance Training: Muscular strength, endurance, & power, Bone mineral density, Sport performance, Mental well-being, Self-esteem, Body Composition, Cardiovascular fitness, Blood lipid profile, Balance, Coordination,

Reduce falling, Resistance to injury, Blood pressure. Factors that Influence the Adaptation to Resistance Training: Genetics, Gender, Nutrition, Psychological Factors, Specificity of Training. Methods: Descriptive methods and current knowledge. Results: There is little evidence to support the superiority of free weights or machines for increasing strength, hypertrophy, power, or endurance. Strength training does not build larger stronger muscles. It is the body's response to the training that builds larger stronger muscles. Discussion: In physiology we encounter various studies about effect of hormones on mens' body composition. Our special interests are gender hormones-the difference between male and female gender hormones and especially uniqueness of effects of male hormones on fat tissue and muscle mass. Male gender hormone (Testosterone) has anabolic effects, and that is very important in sport. Thanks to that hormone, men are the ''stronger gender''-because it affects muscle growth (Grujic, 2004). This means- men possess much more muscle mass than women. Mens' hormone (Testosterone) enlarges (even up to 30%) basal metabolism comparing to womens' hormone. Women, however, have smaller basal metabolism, because they possess larger amount of fat tissue. When we count body mass to a value without fat tissue, the difference is lost. (Nikolic, 1995). Gudalupe-Grau et al. (2009) used the sample consisting of 23 women and 43 men aged 23.9+-, all students at the Faculty of Sport and Physical Education to analyze the answer to the training of strength, combined with the elements of plyometric training, which lasted 9 weeks. The main goal of the research was to establish whether there is a sexual dimorphism in bone density, but it also followed the changes in body composition and shape of the mentioned groups of examinees, as well as the control group. The authors concluded that apart from the increase of the indicators relevant for the evaluation of bone density, there was also the increase of muscle mass, but without decreasing the percent of hypodermic adipose tissue. References: Nikolić, Z. (1995). Fiziologija fizičke aktivnosti. Beograd: Fakultet fizičke kulture Univerziteta u Beogradu. Guyton, A. (1999). Medicinska fiziologija. Beograd: IŠP ''Savremena administracija''. Gudalupe-Grau A, Perez-Gomez J, Olmedillas H, Chavarren J, Dorado C, Santana A, Serrano-Sanchez JA, Calbet JAL. (2009). Strength training combined with plyometric jumps in adults: sex differences in fat-bone axis adaptations. Journal of Applied Physiology; 106(2): 1100-1111.

WOMEN, SPORT AND BABY - IS IT POSSIBLE TO DO/HAVE ALL?

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Introduction: Many women stand in their lives before one question - of family or child? When is the best time to have it, and what I want to accomplish before and and also after childbirth. The same applies to the world of sport. On the contrary, many times it happens that successful athletes decide to end the carreer at an earlyage because of prioritizing the family, or vice versa – they prioritize sport at the expense of their family. The aim is to show that it may not always be the choice of either-or, but that it may be possible to combine maternal duties with the sport provided certain principles are followed. Methods: The research consists of two parts. The first part focuses on the period of pregnancy, ongoing changes in it (physical, psychological, etc.) and exercises that can be included in this period. The second chapter focuses on the period after childbirth and also on sports possibilities for mother and child. This study is descriptive and the data are secondary and were collected from valid documents. This study aims to investigate the way for girls and womes how to do not stop with sport and also have a „normal" family life. Results: To find the right path between sport and family life is not an easy way, but not impossible. Although motherhood is a relatively long time when a woman have to leave the sport, so it

is not impossible to return and gain others sporting achievements. This article points out that, when you progress in this period properly and responsibly with regard to the body and the child, return to the sport career is possible right after birth. Discussion: For the future this topis should be communicate more with young sportswomen, but certainly should not ignore this topic even with athletes-men. They are also basic members of family and they should have more information about how they can help and support theirs life partners at a time and after pregnancy, because they have their own dreams and desires to accomplish something in the world of sport, and therefore does not have a family to postpone until at the end of their careers, or quit sports career at the expense of the family. References: NOVOTNÝ, J. Sport v ekonomice. Vyd. 1. Praha: Wolters Kluwer ČR, 2011, 512 s. ISBN 978-80-7357-666-0. PAŘÍZEK, A. Kniha o těhotenství a dítěti. 3. vyd. Praha: Galén, c2008, 685 s. ISBN 978-80-7262-594-9. BEJDÁKOVÁ, J. Cvičení a sport v těhotenství [online]. Grada Publishing, 2011 [cit. 2014-11-07]. ISBN 80. Dostupné z: https://www.ereading.cz/nakladatele/data/ebooks/5248_preview.pdf. Cvičení po porodu: Všechno, co vás zajímá. In: For Example [online]. 2009 [cit. 2014-11-09]. Dostupné z: http://www.forexample.cz/view.php?cisloclanku=2010050006.

THE EFFECT OF PHYSICAL ACTIVITY ON GENERAL HEALTH LEVEL AND BMI IN TURKISH UNIVERSITY STUDENTS.

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Introduction: High participation of young persons in regular physical and sport activities constitutes the most important effective strategy of national health and fitness policy. Participation regular physical activity (PA) cannot only protect against the development of chronic diseases, but also improve one's quality of life (Centers for Disease Control and Prevention, 2011). Psychological and physical characteristics of individual collectively influence an individual's perception of the overall satisfaction with his/her life (Diener et al. 1999). Thus, the aim of this study to investigate self-reported general health status, BMI and stages of exercise behavior changes in Turkish University male and female students. Method: Data was collected from 200 participants (100 male) students from Mersin University in winter semester 2015/16. The adapted Turkish version of Physical Activity Stages of Change Questionnaire (PASCQ) was used to determine regular physical activity level of university students (Cengiz, 2010). General health status was determined by self-report of participants their anthropometric characteristics including age, body weight, height, and body mass index (BMI) were obtained. The body height of the participants was measured using a metal scale with 0.1 cm sensitivity, and the body weight measurement was measured using a digital weight scale with 0.1 kg sensitivity. The male participants' mean body height. body weight. and body mass index were 175.32±8.8 cm. 67.64±10.23kg. and 21.89±1.91 kg/m2, respectively. The female participants' mean body height. body weight. and body mass index were 168.85±7.97 cm. 59.35±9.78 kg. and 20.72±2.26 kg/m2, respectively. A chi square test was used the determine if there is difference in the distribution between the groups while one-way analysis of variance was utilized for the comparisons among groups. Results: The result of this study showed that the physical characteristics of participants were differentiated among male and female age groups. For males percentages for pre-contemplation, contemplation, preparation, action and maintenance stages were 21 %, 18 %, 9 %, 6 % and 46 % respectively. For females these values were for 19 %, 16 %, 13 %, 11 % and 41 % respectively. BMI values were irregularly changed depending PA level. In females the perception of general health status was highest at maintenance level. In males this value was higher at preparation

stages than maintenance. Conclusion: PA was not affective on BMI. General health perception with PA was increased with PA level in male and female university students. References: Centers for Disease Control and Prevention. (2011). Physical activity and health. Cengiz, C. (2010) Physical activity and exercise stages of change levels of Middle East Technical University Students. Middle East Technical University, Unpublished Master Thesis. Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. Psychological Bulletin, 123(2), 276–303.

Motor Learning

THE EFFECT OF RHYTHM AND DANCE PRACTICE ON SOME MOTOR ABILITIES IN CHILDREN.

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Introduction: It is very important to provide many physical activities for the children to get an effective motor development. Those kind of physical activities should be fun for the children. One way can be to implement rhythm and dance activities. Musical accompaniment can be very beneficial for the acquisition of the fundamental motor skills (Brown, Shrill, & Gench, 1981). Thus, the purpose of this study was to find the effect of dance practice on some motor abilities in children. Method: Experimental group (15 children, 5 years old) underwent a ten-week rhythm and dance practice and control group (15 children, 5 years old) did not participate any planned activities. Prior to and after the ten-week experimental rhythm and dance practice, carried out two times in a week, some motor abilities were tested in children. The rhythm and dance practice was included mainly steps, gallops, skipping, and arm movements. The main aim of the dance practice was to teach basic dance movements and sense of rhythm. Five different dances were thought to the children. Agility, balance (static and dynamic), and standing long jump abilities were tested. Results: The result of the statistical analysis displayed that experimental group performed better motor abilities in agility and balance but not in standing long jump. The better performance in agility and balance were mainly caused by the implementation of the dance practice. Discussion: The result of this study was in parallel with previous studies where researcher emphasized the importance of the music and dance practices (Derri et al., 2001; Kostic et al., 2002). In conclusion, rhythm and dance practices should be a part of the programs in kindergartens. By this way, children can get better motor development, which is essential not only to have an ideal physical appearance and also to be advantageous for participation sports activities. References: Brown, J., Shrill, C., & Gench, B. (1981). Effects of an integrated physical education/music program in changing early childhood perceptual-motor performance. Perceptual and Motor Skills, 53, 151-154. Derri, V.,Tsapakidou, A., Zachopoulou, E., & Kioumourtzoglou, E. (2001). Effect of a music and movement programme on development of locomotive skills by children 4 to 6 years of age. European Journal of Physical Education, 6 (1), 16-26 Kostic, R., Miletic, D., Jocic, D., & Uzunovic, S. (2002). The influence of dance structures on the motor abilities of preschool children. Facta Universitatis, Series: Physical Education and Sport, 1 (9), 83-90.

Physical Education and Pedagogics

REFORMING PHYSICAL EDUCATION TEACHER EDUCATION PROGRAMS IN THE WORLD: OBESITY EPIDEMIC AND SCHOOLS IN 21ST CENTURY.

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Introduction: The purpose of this paper is to analyze different approaches in reforming PETE programs with a critical inquiry for the future. Physical Education Teacher Education (PETE) programs should connect to reality of school life with collaborative and innovative efforts to improve quality of school physical education programs. Methods: The data was collected using a literature review in the field of physical education teacher education and other related fields. Results: The results showed that reforming physical education teacher education programs is a very complex issue and there are many factors. Knowledge base will also be an important concept in the future. Shulman (1987) defined knowledge base of teaching as a different way of knowing that is essential for teachers. This includes: a) content knowledge, b) pedagogical content knowledge, and c) pedagogical knowledge. Discussion: Recently, obesity epidemic is number one factor that affecting children's health and overall well-being in the world. Children are spending more screen time including computer and videogames and participation to physical activity is very low. Therefore, school physical education programs have very critical role to solve physical activity and health issues and they should be reorganizing their programs in an innovative way. At this point, Erwin, Beets, Centeio, & Morrow (2014) suggested a "National Physical Activity Plan" for children including seven strategies: In the final analysis, Ward and Doutis (1999) stated that there are two reasons why physical education is not a part of contemporary school reforms. First, physical education is not considered as a core academic subject and perceived as unrelated to the central mission of the school reform. Second, physical education as a profession did not make a case about why it should be an important part of school reforms. References: Erwin, H. E., Beets, M. W., Centeio, E., & Morrow, J. R. (2014). Best practices and recommendations for increasing physical activity for youth. Journal of Physical Education, Recreation and Dance, 85(7), 27-34. Shulman, L. S. (1987). Knowledge of teaching: Foundations of the new reform. Harvard Educational Review, 57 (1), 1-22. Ward, P., & Douitis, P. (1999). Toward a consolidation of the knowledge base for reform in physical education. Journal of Teaching in Physical Education, 2 (18), 382-402.

MONITORING CHILDREN'S GROSS MOTOR COORDINATION DURING ONE YEAR; EVIDENCE BASED ON GENDER DIFFERENCES.

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Introduction: The phase before puberty is marked by a very good motor learning ability and is proven to be the best motor learning age in childhood (Meinel 1960). In Albania there are several studies focusing on sport participations, obesity and physical activity promotion on children (Jarani et al.,2014a; Jarani 2014b) but a few of them have the main focus on motor abilities (Ushtelenca et al., 2013). The purpose of this study is to monitor and identify differences on the performance of gross motor coordination in one year for boys and girls. Methods: A total of 577 children 7 and 8 years old (281 girls and 296 boys) respectively in four elementary schools in Tirana City were randomly selected. To monitor and compare gross motor

coordination level by gender from Time 1 (2014) to Time 2 (2015) were used four tests from the KTK-Body Coordination Test for Children (Kiphard EJ, Schilling F 1974); the balance beam test aiming to assess active balance, while walking along on a an gymnastics balance beam, plate movement test to measure upper body movement speed and coordination, jumping one leg where children were asked to jump over the mets from the lower level up to their maximum level and lateral jumping test jumping laterally as many times as possible over a wooden slat in 15 seconds. Results: The results from balance bean test show; for boys (T1- 47.3 steps and T2- 47.5 steps; p=0.938) while for girls (T1- 53.4 steps and T2- 50.1 steps; p= 0.257) while from testing on plate movement; for boys (T1- 22.6 counts and T2- 21.1; p=0.175) while for girls (T1- 21.3 counts and T2- 21.4 steps; p=0.856) . Data for the two other tests show; jumping one leg for boys (T1- 51.7 points and T2- 40.8 points; p=0.000) while for girls (T1- 57.3 points and T2- 52.0 points; p= 0.153) while from testing on lateral jumping; for boys (T1- 65.3 jumps and T2- 65.3 jumps; p=0.996) while for girls (T1- 62.3 jumps and T2- 65.5 jumps; p=0.278). Conclusion: Based on this study we found out that there was a stagnation on the performance of gross motor coordination from year 2014 to year 2015 in boys and girls. There was a decrease (significant) in the values on boys performing jumping with one leg test. References: Kiphard, B.J., & Schilling, F. (1974). Körperkoordinationtest für Kinder. Weinheim, Germany: Beltz. Jarani. J, Muca. F, Spahi. A, Qefalia, D and Shaka, L (2014a). Threats of new generation on physical activity level in Albanian children, Montenegrin Journal of Sports Science and Medicine 40, 151-158. Jarani, J. Ushtelenca K and Spahi A (2014b). The current level of health and skills related fitness indicators in Albanian children; reference values from a country in transition, Faculty of Kinesiology University of Zagreb 1, 264-268. Ushtelenca K, Pasha and Ommundsen Y (2013). An investigation study on BMI, percent body fat, coordination abilities and the relationship between them, on 6-7 years old children in Tirana, Journal of Physical Activity and Sports 1(1), 37-44.

IMPORTANCE OF SPORT IN STUDENT'S LIFE AND FREQUENCY OF SPORTS PARTICIPATION AMONG STUDENTS - GENDER DIFFERENCES.

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Introduction: The purpose of this study was to analyze the gender differences among students at the University of Ljubljana in importance of sport in student's life and frequency of sports participation. Methods: The research was done during the academic year 2013 on 3% random sample of the students of the University of Ljubljana (N = 1390). In this study, we analyzed two variables: 1) importance of sport in student's life and 2) frequency of sports participation. In variable importance of sport in student's life, respondents had to choose one answer on six-Likert scale. In variable frequency of sports participation, students had to choose one answer between seven answers. The data of variables was analyzed with SPSS for Windows. We calculated the basic statistics parameters. We have analyzed the gander differences with t-test and Mann-Whitney's U test. Results: First analyze showed us, that sport is very important part of student's life for both sexes. We found that 61,9% of male and 53,2% of female respondents reported that sport is important and very important in their life. The analyze of mean values showed us that the mean values were a little more higher for male students (male = 4,65; female = 4,47). Although we found small differences, the t-test for equality of means showed us that gender differences were statistically significant (p=0,012). The second analyze showed us that students of both gender practice sport frequently. The 81,6% of male and 77,1% of female respondents reported that they were sport active every day, 4 to 6 times a week or 2 to 3 times a week. The analyze of median values showed us, that male students are practicing sport more often

(5,43) than female (5,19). Although the differences are not big, the Mann-Whitney's U test showed us that gender differences were statistically significant but size effect was small (p=0,000; r = -0.10). Discussion: The current findings support the previous resarchers that was done among students (Majerič, 2002; Majerič in Markelj, 2010; Cerar, 2013, Majerič, 2015). We confirmed that sport is still a very important part of student's life among male and female students and both of them were practicing sport frequently. But nevertheless, male students were more sport active than female. References: Cerar, K. (2013). Motivacijski dejavniki študentov Univerze v Ljubljani za ukvarjanje s športno dejavnostjo. Magistrsko delo. Ljubljana: Fakulteta za šport. Majerič M., Markelj, N. (2010) Analiza nekaterih dejavnikov ukvarjanja s športom pri študentih. Šport, 57(3-4), 14-17. Majerič, M. (2002). Struktura motivov za športno dejavnost pri študentih Univerze v Ljubljani. Magistrsko delo. Ljubljana: Fakulteta za šport. Majerič, M. (2015). Analiza razvoja in pogostost ukvarjanja s športom pri študentih Univerze v Ljubljani. Šport, 63 (3-4), 109-112. Sila (2010). Delež športno dejavnih Slovencev in pogostost njihove športne dejavnosti. Šport, 58(1-2), 89-93.

GENDER DIFFERENCES IN POPULARITY AND ENGAGING IN SPORTS ACTIVITIES AMONG STUDENTS.

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Introduction: The purpose of this study was to analyze the gender differences among students at the University of Ljubljana in engaging in different sports activities (from walking to cycling and various sports games) and types and modes of these sports activities. Methods: The research was done during the academic year 2013 on 3% random sample of the students of the University of Ljubljana (N = 1390). In this study, we analyzed two groups of variables: 1) the popularity of different sport activities and 2) types and modes of sport activities. In variables the popularity of different sport activities the respondent had to choose one to three sport activities (of 63) that they were doing most often. In variables types and modes of sport activities, the respondends had to choose one answer on six-Likert scale for each (eight) different types and modes of sports activities. The data of variables was analyzed with SPSS for Windows. We calculated the basic statistics parameters for both variables. We have analyzed the gander differences Mann-Whitney's U test. Results: The first analysis showed us, that among students where some sports more popular among male, and others were more popular among female students. T-test for equality of means showed us that gender differences were statistically significant (p=0,000) in jogging, walking, football, basketball, fitness, aerobics and dance activities. Second analysis showed us that students of both gender practice sport more or less in unorganized types and modes. The Mann-Whitney's U test showed us that gender differences were statistically significant in two variables that represent competitive types of sport activities (p = 0,000, r = -0,11). Discussion: The current findings support the previous resarchers (Majerič, 2002; Sila & Pori, 2010). In the most popular ten sports among Slovene adults (Sila & Pori, 2010) we find all sports, that are also popular among male and female students. We had compared our findings (Majerič, 2002) and we found, that in 2013 the popularity of sports activities among male and female students had changed. Both the male and female students prefer unorganized types and modes of sport activities. The only main differences between male and female students were, that some of the male students preferred doing sport in competitive types and modes. References: Majerič, M. (2002). Struktura motivov za športno dejavnost pri študentih Univerze v Ljubljani. Magistrsko delo. Ljubljana: Fakulteta za šport. Pori, M. & Sila, B. (2010). S katerimi športnorekreativnimi dejavnostmi se Slovenci najraje ukvarjamo. Šport, 58(1-2), 105-107.

Physiology

THE EFFECTS OF SODIUM BICARBONATE AND SODIUM CITRATE ON BLOOD pH, HCO3-, LACTATE METABOLISM AND TIME TO EXHAUSTION.

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Introduction: The purpose of this study was to compare the effects of sodium bicarbonate and sodium citrate in increasing lactate concentration, blood pH, HCO3-, and time to exhaustion. Increased time to exhaustion is an advantage since the athletes can do more anaerobic work, especially in anaerobic sport performance. Exhaustion happened when blood pH decreasing as lactate metabolism produce more H+, and it could be delayed by increasing HCO3- to catch H+ produced by lactate metabolism to form H2O and CO2. So, both sodium bicarbonate and sodium citrate were ergogenic aids. Method: The design of this research was randomized pretest posttest control group design, thus an experimental research. Thirty badminton student players were randomly selected and randomly assigned to three groups. The first group (the control group) was given placebo, NaCl .9 g/dl, the second group was given sodium bicarbonate 300 mg/kg in 500 ml aqua, and the third group was given sodium citrate 300 mg/kg in 500 ml aqua. Blood pH and bicarbonate ion (HCO3-) were measured through Opti Medical Blood gas Analyzer. Lactate was measured by Cobas Roche lactate Analyzer. Data was analyzed using Manova with .05 significant levels. Results: Blood pH of the groups taking sodium bicarbonate and sodium citrate were higher significantly against control group ($p<.05$), and sodium bicarbonate group was significantly higher than the sodium citrate group ($p<.05$). Blood lactate tests showed that sodium bicarbonate group and sodium citrate group gave significant difference vs control group ($p<.05$), whereas sodium bicarbonate did not differ significantly against sodium citrate ($p>.05$). Sodium bicarbonate is better than sodium citrate and control ($p<.05$), even though sodium citrate is also better than control ($p<.05$). Discussion: Sodium bicarbonate is better than sodium citrate in increasing blood pH and time to exhaustion to give more time for anaerobic work for the athletes, but the disadvantage of using sodium bicarbonate is it can cause gastrointestinal problem and headache, so it is not advisable to be used by athletes who have the symptoms. References: Peart DJ, Siegler JC, Vince RV.2012. Practical recommendations for coaches and athletes: a meta-analysis of sodium bicarbonate use for athletic performance. J Strength Cond Res. 2012 Jul;26(7):1975-83, Requena B, Zabala M, Padial P, Feriche B.2005. Sodium bicarbonate and sodium citrate: ergogenic aids? J Strength Cond Res. Feb; 19(1):213-24.

Psychology

MENTAL TOUGHNESS ATTRIBUTES OF JUNIOR LEVEL MEDALIST BADMINTON PLAYERS.

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Introduction: Mental toughness is a psychological construct that is associated to successful sports performance (Crust, 2008). The study aims to compare the mental toughness attributes between medalist and non-medalist badminton players and between male and female players. Methods: Participants were 15 male and 15 female badminton players aged between 13-19 years (M= 15.71, SD=2.82). Mental

toughness questionnaire of Tiwari and Sharma (2006) was administered and the data were analyzed by using descriptive statistics and t-test. Statistical significance was set at 0.05. Results: Medalist players have exhibited higher mean values on self-confidence, attention control, motivation and goal setting attributes. Overall mental toughness of medalists was higher 180.80±17.15 than non-medalists 170.25±20.10. Comparison analysis showed significant difference between medalists and non-medalists on mental toughness attributes: Self-confidence (SCO: p=0.001<.05), medalist scored (M±SD=31.33±2.10) higher than non-medalist; motivation (MOT: p=0.006<.05), medalist scored higher (M±SD=33.50±4.07; goal setting (GSE: p=0.044<.05), medalist scored significantly higher (M±SD=33.55±4.11) than non-medalists. Other attributes did not show any significant difference between medalist and non-medalist players. When compared with gender, no significant difference was observed on mental toughness attributes except attention control (ATNCON: p=0.044<.05), female players scored (M±SD=38.97±3.08) higher than male players. Discussion: The findings confirm that mental toughness is a desired attribute which differentiates a medalist and non-medalist player. Connaughton et al., (2007) stated that elite competitive athletes possess better mental toughness. Medalist players displayed better self-confidence than the non-medalists as supported by Kuan & Roy, 2007; Loehr, 1986. Motivation helps players to achieve their best and enhance mental toughness (Connaughton et al., 2008; Mohammad et al., 2009). Goal setting determines successful performance Weinberg & Weigand, 1993; Weinberg, 2003. It was concluded that medalist badminton players showed better mental toughness attributes than non-medalist. References: Connaughton D, Hanton S, Jones G (2007). Sport Psychologist, 21(2), 243-64. Connaughton D, Wadey R, Hanton S, Jones G (2008). J Sport Sc, 26, 83-95. Crust L (2008). Person and Indi Differ, 45(7), 576–83. Kaun G, Roy J (2007). J Sports Sci Med, 6(CSSI-2), 28–33. Loehr JE (1986). Mental toughness training for sports: Achieving athletic excellence. Stephen Greene Press. Mohammad NA, Omar FMS, Abu SB (2009). Res J Int Studies, 12, 67-78. Weinberg RS (2003). Revi de psico del deporte, 4(2),115-25. Weinberg R, Weigand D (1993). J Sport & Ex Psy, 15, 88–96.

HOW TO INCREASE MOTIVATION FOR PHYSICAL ACTIVITY AMONG YOUTH?

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Introduction: The primary aim of the present study was to explore motivational profiles for physical activity in current students of secondary schools. The development of motivation is a process which takes time (Deci and Ryan, 2000). Methods: The participants of the study were (N = 526) (males= 267 females=259) 8th , and 9th grade students from the four secondary schools in the cental and northern part of Kosovo. Data were collected through focus group discussions for students, during the month of May and June 2014/2015 school year, in order to gather qualitative data regarding students' perceptions of motivation and participation in PE and extracurricular Physical and sport activities. Results: Republic of Kosovo schools are not creating supportive and attractive school environment for children and adolescents in doing physical activity and sorts in daily basis. Many schools (PE Teachers) make a mistake requiring every child to become an athlete, by suppressing child motivation and enjoyment for sport and creative physical activities. Discussion: Physical education and sports module school based should offer the opportunities for different physical activities that people can do for a life time. PE and sports curricula should be focused on giving the opportunity to every child to excel their own skill level, and integrate teaching strategies for "maximum movement for maximum kids". References: Porter S. Physical Activity: An Exploration of the Issues and Attitudes of Men in Mid Years. London: Scott Porter

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BEHAVIOR CHANGE OF PHYSICAL ACTIVITY AND HEALTH AMONG SCHOOL-AGE CHILDREN AND YOUTH.

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Introduction: Our schools should and probably will have to adopt creativity and innovation in learning and teaching PE. School settings can provide students with an environment for positive learning and healthy living. Main goal of this study was to find out how healthy are adolescents attending primary and high schools in Kosovo during their early stage of adolescence period? Methods: The participants of this study were six physical education (PE) Teachers (males=4; females=2) from two primary and four secondary schools, with 7 to 38 years of physical education teaching experience. Interviews, observations and the focus group discussions were the methods used to collect data. Results: This research used a qualitative approach to identify concerns, causes and possible teacher-proposed interventions to address the school physical activity and nutrition issues. Future studies would benefit from larger sample sizes and stronger research designs that include longitudinal follow-up, as appropriate. Discussion: Schools might allow access to facilities before and after school hours and during vacation periods, encourage teachers to provide time for unstructured physical activity during recess and during physical education class, and help school personnel to serve as active role models by enabling and encouraging their own participation in physical activity. Schools that promote physical activity may have a significant impact on reducing childhood sedentary lifestyle and raising awareness of parents about positive impact on health of regular Physical activity. References: Armitage, C. J. (2009). Is there utility in the trans theoretical model?. British Journal of Health Psychology 14, 195-210. Centers for Disease Control and Prevention. (2008). Youth risk behavior surveillance—United States, 2007. MMWR; 57 (SS-4):1–131. Joint Health Surveys Unit. (2004). Health Survey for England 1998. London: HMSO. Porter S. (2002). Physical Activity: An Exploration of the Issues and Attitudes of Parents of pre Fives. London: Scott Porter Research and Marketing.

Rehabilitation

SICK LEAVES DURING THE LOW BACK PAIN AND INFLUENCE OF OBESITY ON ITS PROLONGING.

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Introduction: Lumbar syndrome (LS) is common problem from which the patients remain bedridden, unable, therefore working productivity is lost. Stiffness (blockage) in the lumbar-sacral part

of the spinal cord limits locomotors movement, flexion, extensions and other normal daily activities. Purpose- of this work is to determine the duration of the sick leaves during one year period at patients with low back pain. Material and methods: The research was carried out in the Physiatrist Service of the Institute of Occupational Medicine (IOM) during the one year period. The total number of patients included in the research was 101, who were adult employed in the Energy Corporation of Kosovo (ECK). The subjective and objective data were collected from the medical record and the duration of the sick leaves was registered, comparing with obesity. Results: Only 11 or 10.9% of the diseased, during the period of research, didn't use their sick leaves because of the low back pain. While the greater number of them 30 or 29.7% have used one or two weeks sick leave. By the distribution of the cases according to the groups we have got similar structure, and it can be seen from the t-test, where we didn't get important statistical significance between the groups comparing to the duration of sick leaves per week ($t=0.602$, $P>0.05$). While the average number of the sick leaves of the diseased from non-obese group was 3,94 per week (SD±3.74 week), rank 0-19 week , while the result in obese group was 4.42 week (SD±3.58 week), Rank 0-13 week. Discussion: During our work we found that 89% of the diseased have used their sick leaves. Approximate data are presented also by Wittink H et Al [5]. We got contradictory data regarding the bedridden sick leaves or application of the physical therapy in the acute phase. Barclay L [6] came to a conclusion that in regards to the acute low back pain, the diseased who are active during this phase have more benefits in relation to decreasing of pain and preservation of the function in comparison to the ones who stay bedridden (lying) at this phase. At the diseased who suffered the pain along N. Ishiadicus there wasn't found significant difference whether they stayed active or bedridden. References: Szpalski M, Gunzburg R, Rydevik B. Le Huec JC, Mayer HM (2010). Surgery for Low Back Pain. Springer-Verlag: Berlin. Twomey LT, Taylor JR (1987). Physical therapy of the low back. New York: Churchill Livingstone, 5-114. Pengel, L. H. M., Herbert, R. D., Maher, C. G., & Refshauge, K. M. (2003). Acute low back pain: systematic review of its prognosis. BMJ : British Medical Journal, 327(7410), 323. [PubMed]. Maitland's G, Hengeveld E, Banks K, English K (2005). Maitland's vertebral manipulation. Elsevier. 342,343. Wittink H, Michel T (2002). Chronic pain management for physical therapists. Elsevier Health Sciences. Barclay L (2007). Guidelines Issued for Management of Low Back Pain. Medscape. Ann Intern Med. 2007;147:478-491.

Training and Testing

SPORT-SPECIFIC MORPHOLOGY PROFILE: DIFFERENCES IN ANTHROPOMETRIC CHARACTERISTICS AMONG ELITE SOCCER AND HANDBALL PLAYERS.

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Introduction: The purpose of this study was to determine differences in anthropometric parameters among elite soccer and handball players. It is expected that top level athlete represents expression of potential through heritage, training, nutrition and sociology-cultural factors. In top level competition morphology characteristics of players are important reference in orientation and selection closely related with sport achievements and results (Bourgois J. et al., 2000). Quantification and comparative analysis of anthropometric data supports coaches with information for better understanding specific demands of certain sport where particular morphology type will express full potential and achieve top sport

performance. Methods: This study was conducted on sample of 41 male subjects divided into two groups: 26 soccer players and 15 handball players from premier league of Serbia, analyzed and compared in 20 anthropometric variables. Statistically significant differences were analized by t-test. Results: Based on compared data, significant differences were found in 12 variables where in 11 variables handball players had significantly greater values. Soccer players had significantly greater value only in lower leg skin folds variable. Discussion: Sport-specific morphological characteristics of top class players have great importance for many authors (Di Salvo et al., 2007; Gorostiaga et al., 2009) with interest of finding best morphology type for particular sport, competition level or player position. Some studies had similar findings, where soccer players had lower values in most anthropometric variables and greater values in lower leg skin folds (Joksimovic & Joksimovic 2008; Stankovic et al., 2009) that could be caused due to higher training load for lower extremities compared to handball, basketball and volleyball. Similar differences were found (Smajic et al., 2015) with female athletes where in most variables handball players had higher values and soccer players had higher value only in minimum circumference of lower leg. References: Bourgois J, Claessens A, Vrijens J, et al. (2000). British J of Sport Med, 34(3), 213-216. Di Salvo V, Baron R, Tschan H, Calderon Montero FJ, Bachl N, Pigozzi F (2007). Int J Sports Med, 28, 222-227. Gorostiaga EM, Llodio I, Ibanez J, et al. (2009). Eur J Appl Physiol, 106, 483-391. Joksimovic I, Joskimovic A (2008). J of Anthropol Soc of Serbia, 43, 271-282. Stankovic V, Malacko J, Doder D (2009) Acta Kinesiologica 3, 2, 30-94. Smajic M, Ujsasi D, Djukic B, Kapidzic A (2015). Coll Sport and Health, 8, 288-295.

Poster Presentations

Adapted Physical Activity

STRUCTURE OF COGNITIVE ABILITIES OF LIFEGUARDS.

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Introduction: The presence of lifeguard service on beaches greatly contributes to reducing the number of accidents in and around the water. The lifeguard can be a person with good motor, but also cognitive skills and abilities. In addition to good swimming skills, lifeguard must be able to quickly detect and recognize the accident, and also to be able to timely and correctly act in case of accident in water, but also at the beach. Methods: The goal of this study is to determine the structure of cognitive abilities and skills with the sample of lifeguards that work on Montenegrin beaches. Battery KOG-3 was applied on the sample of 40 lifeguards. Results: The collected and achieved results lead to following conclusion: the subjects have good ability to determine relation between elements of a structure and lower characteristics of that structure; subjects have good ability to assess the efficiency of serial processor; and subjects have good ability to assess efficiency of perceptive processor. Discussion: Results achieved in this way can be interpreted, with high level of reliability, in framework of Cattella cognitive theory (1963, 1971). Dimension interpreted as efficiency of perceptive processor is very close to general perceptive factor (Gp); dimension interpreted as efficiency of parallel processor is very close to factor of fluid intelligence (Gf); while dimension interpreted as efficiency of serial processor can be accepted as measure of factor of crystallized intelligence (Gc), (Cattell, 1963,1971; Horn i Cattell, 1966). Results of this study and research can be helpful in profiling staff for such responsible job as the beach lifeguards. References: Catttell, R.B. (1963). Theory of fluid and crystallized intelligence: a critical experiment. Journal of Educational Psychology, 54, 1-2. Cattell, R.B. (1971). Abilities; their structure, grown and action, Huhton Miggilin, Boston. Cattell, R.B. (1973). Personality and mood by questionnaire, Bass, San Francisco. Horn, J.L & Cattell, R.B. (1966). Refinement and test of the theory of fluid crystallized intelligence. Journal of Educational Psychology, 57, 253-270.

Biomechanics

THE IMPROVEMENT OF EQUILIBRIUM THROUGH YOGA EXERCISES.

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Introduction: Yoga, one of the most ancient cultures of physical education, is a physical, mental and spiritual discipline and it has been made part of curricular program in SUT. We took the responsibility

to study the equilibrium quality as a discipline which has never been studied before in Albania. The aim of this study is to assess how postural sway is affected in two different conditions, Eyes Open and Tandem Eyes Closed tests in balance training through yoga exercises. One of the most important yoga exercises is balance training. This training helps in improving coordination system in static and dynamic activities. The reason for describing such exercises is to explain the benefits of yoga exercises to the equilibrium system. Methods: 50 healthy male and female subjects, aged 20-25 years old from Sports University of Tirana (UST) and Albanian University (AU), participated in this study. The mean age was 21.14 years old for UST subjects and 22.07 for AU subjects. The measurements were recorded in force plate Biomechanics Laboratory of SUT. The balance testing Romberg protocol was used to collect the data, in two different conditions: Romberg One Leg Open Eyes (1L_EO) and Tandem Eyes Closed (TanEC). The sway parameters were taken during the COP trajectory shifts, along the time interval of 10 second. This study included a three months period, followed by a re-valuation (balance training in yoga exercises effect). The repeated measure analyses paired t-test was used to see the effect of yoga exercises in equilibrium system. Statistical analyses were performed using SPSS version 17. A value of $p < 0.05$ was considered statistically significant. Results: The results show that in EO condition, the absolute change and its percentage are respectively: for velocity and pathlength smaller for SUT subjects compared to AU subjects; for Sway Area (SA); Equilibrium (EQ) score and Sway Index (SI) higher for SUT than AU subjects. While in TanEC condition, these parameters results: velocity, pathlength, EQ, and SI higher for SUT than AU subjects, meanwhile EQ Score is lower for SUT subjects compared to AU. After training the EQ score is clearly higher than before training, due to the effect of balance training through yoga exercises. Discussion: The control analysis (paired t-test) shows that no essential difference between both SUT and AU subjects, despite the fact that the test is carried in EO or EC conditions, as it is reported by p-values ($p < 0.05$) for both conditions of balance tests. The improvements have been more obvious in TanEC balance test, due to the effect of meditation. From comparison of the sway parameters of SUT and AU subjects, results that this improvement has been higher at SUT subjects, because of their prior physical preparation. The results have verified the benefits of yoga exercises to the equilibrium system, as well as the necessity of these yoga exercises training development, to improve the life quality, even in other psychological and emotional dimensions.

Coaching

BODY HEIGHT AND ITS ESTIMATION UTILIZING ARM SPAN MEASUREMENTS IN MALE ADOLESCENTS FROM SOUTHERN REGION IN MONTENEGRO.

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Introduction: Anthropologists recognized the tallness of nations in the Dinaric Alps long time ago (Popovic et al, 2013). As the modern Montenegrins fall partly into the Dinaric racial classification (Bjelica et al., 2012), the purpose of this study was to examine the body height in Montenegrin male adolescents from southern region as well as the relationship between arm span as an alternative to estimating the body height, which would vary from region to region in Montenegro. Method: Our investigation analyses 87 male adolescents from the southern region in Montenegro. The anthropometric measurements were taken according to the protocol of the International Society for the Advancement of Kinanthropometry (ISAK). Means and standard deviations regarding the anthropometric measurements were obtained. The

relationships between body height and arm span were determined using simple correlation coefficients and their 95% confidence interval. Then a linear regression analysis was performed to examine the extent to which the arm span can reliably predict body height. Results: The results displayed that male Southern-Montenegrins are 182.53±7.53cm tall and have an arm span of 184.55±9.03cm. Discussion: Compared to other studies, the results of this study have shown that this gender made Southern- Montenegrins the tall population, taller than most of nation around the Europe (Bjelica et al., 2012). On the other hand, expectably, the arm span reliably predicts body height in this gender. However, the estimation equations which have been obtained in Southern-Montenegrins are, different alike in general population, since arm span was closer to body heights (2.03±1.50 centimetres), more than in general population (Bjelica et al., 2012). Hence, this study also confirms the necessity for developing separate height models for each region in Montenegro. References: Popović S, Bjelica D, Molnar S, Jakšić D, Akpinar S (2013). International Journal of Morphology, 31(1), 271-279. Bjelica D, Popović S, Kezunović M, Petković J, Jurak G, Grasgruber P (2012). Anthropological Notebooks, 18(2), 69–83.

BODY HEIGHT AND ITS ESTIMATION UTILIZING ARM SPAN MEASUREMENTS IN FEMALE ADOLESCENTS FROM SOUTHERN REGION IN MONTENEGRO.

Popović, S.[1], **Milašinović, R.**[1], **Jakšić, D.**[2], **Vasiljević, I.**[1], **Bjelica, D.**[1]
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Introduction: Anthropologists recognized the tallness of nations in the Dinaric Alps long time ago (Popovic et al, 2013). As the modern Montenegrins fall partly into the Dinaric racial classification (Bjelica et al., 2012), the purpose of this study was to examine the body height in Montenegrin female adolescents from southern region as well as the relationship between arm span as an alternative to estimating the body height, which would vary from region to region in Montenegro. Method: Our investigation analyses 139 female adolescents from the southern region in Montenegro. The anthropometric measurements were taken according to the protocol of the International Society for the Advancement of Kinanthropometry (ISAK). Means and standard deviations regarding the anthropometric measurements were obtained. A comparison of means of body heights and arm spans within this gender group were carried out using a t-test. The relationships between body height and arm span were determined using simple correlation coefficients and their 95% confidence interval. Then a linear regression analysis was performed to examine the extent to which the arm span can reliably predict body height. Results: The results displayed that female Southern-Montenegrins are 168.73±6.79cm tall and have an arm span of 167.23±7.79cm. Discussion: Compared to other studies, the results of this study have shown that this gender made Southern- Montenegrins the tall population, taller than female population across the Europe and the rest of World (Bjelica et al., 2012). On the other hand, expectably, the arm span reliably predicts body height in this gender. However, the estimation equations which have been obtained in Southern-Montenegrins are, different alike in general population, since arm span was shorter than the body heights (1.50±1.00 centimetres), much more than in general population (Bjelica et al., 2012). This study also confirms the necessity for developing separate height models for each region in Montenegro. References: Popović S, Bjelica D, Molnar S, Jakšić D, Akpinar S (2013). International Journal of Morphology, 31(1), 271-279. Bjelica D, Popović S, Kezunović M, Petković J, Jurak G, Grasgruber P (2012). Anthropological Notebooks, 18(2), 69–83.

Health and Fitness

TRAINING AND DETRAINING BALANCE CHANGES IN TRAINED AND UNTRAINED ELDERLY UNDERGOING A FIVE-MONTHS MULTICOMPONENT TRAINING PROGRAM.

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Introduction: Falls prevention combine strength and balance in healthy older adults (Lacroix et al., 2015). Multicomponent training programs (MCTP) have shown to be an integrative way to improve both, becoming promising. Stabilometry analyses assess quantitative and qualitative changes in balance, e.g. the improvement of the sway area following a nine-months MCTP including strength, balance, flexibility and cardiovascular training (Seco et al., 2013). Our study aims to analyze balance-changes comparing trained (TRA) and untrained (UNT) elderly, following a five-month cognitive MCT based on gait training and Dual-Task neuromuscular proposals in enriched environments (EFAM-UV). 3 months of Detraining were included. Methods: 10 trained subjects (2-years EFAM-UV; 70.77±6.26y; 68.15±5.87kg) and 9 untrained (72.22±8,73y; 80.24±16.93kg) were assessed through the balance platform BT4 (Hur Labs) pre, post and 3 months after the EFAM-UV intervention (DT3). Sway area (C90) and trace length (TL) were assessed during a Romberg's test session: 2*30s Open-Eyes and Closed-Eyes (OE, CE), 30s of rest. Results: Logarithmic transformation were considered (Nardone et al., 2006). Bonferroni post-hoc comparisons revealed Pre-MCTP group significant differences for TL_OE (TRA: 5.63±0.23; UNT: 5.91±0.28 p=0.03) and TL_CE (5.95±0.28; 6.34±0.43; p=0.03) but not post-MCTP. However, after DT3 we found again TL significant differences in OE (5.62±0.24, 6.07±0.93; p=0.007) and CE (5.88±0.33, 6.37±0.49; p=0.02). C90_OE showed a Pre-MCT slight trend towards significance (4.81±0.6, 5.35±0.68; p=0.84) and post-DT3 (4.95±0.34, 5.52±0.78; p=0.51). C90_CE showed UNT significant differences post-DT3 (4.75±0.65, 5.62±0.59; p=0.007) with not TRA differences. Discussion: 5 months point to be enough for balance improvement after a functional & cognitive MCTP in untrained elderly, although this progress decreases 3 months later. Short interventions could lead to early worsening, so the ratio training-detraining might be reconsidered. COP area might not be the best indicator of postural stability (Wuest et al., 2014) due to a larger co-activation related to fear to fall (Park, 2014). References: Lacroix, A., Kressig, R., Muehlbauer, T., Gschwind, Y., Pfenninger, B., Bruegger, O., et al. (2015). Gerontology, 2, 1-14. Nardone, A., Grasso, M., & Schieppati, M. (2006). Gait Posture, 23, 364-373. Park, J. W., Jung, M., & Kweon, M. (2014). J Phys Ther Sci, 26(3), 381-384. Seco, J., Abecia, L., Echevarria, E., Barbero, I., Torres-Unda, J., Rodriguez, V., et al. (2013). Rehabil Nurs, 38(1), 37-47. Wuest, S., Borghese, N. A., Pirovano, M., Mainetti, R., van de Langenberg, R., & de Bruin, E. D. (2014). Games Health J, 3(2), 106-114.

THE IMPACT OF STRENGTH TRAINNING DURING 12 WEEKS ON VO2 MAX OF BODYBUILDERS.

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Introduction: According to the an article by Ozaki et al., 2013, is an undeniable fact, that training with weights is a powerful stimulus for muscle hypertrophy and strength gain, but this is less understandable if the weight training can increase maximal aerobic capacity (VO2max). The purpose of this intervention

study is to find out whether circuit system training exercises with weights increases VO2max among bodybuilders (20-40 years). Methods: The data was collected from 23 male bodybuilders in Tirana (12 male performed the intervention program while 11 male were control group that did the usual training program). Ergometer test were used to evaluate the VO2 Max. The intervention training program lasted 12 weeks on frequency 4 times per week. It was used circuit weight routine with an intensity between 60% to 70% on 2 group muscles in a session (8 – 10 exercises, 3 – 5 circuits, 12 – 20 reps). Results: The results showed that the baseline mean values for intervention group was 29.96 ml/kg/min and control group 34.69 ml/kg/min. After the intervention the results showed that intervention group had a mean values 38.26 ml/kg/min while control group 34.18 ml/kg/min. Discussion: In conclusion the results show significant improvement on VO2 Max on intervention group (F=7.440; p= 0.016) and no significant improvement on control group (F=3.835; p= 0.069). Finally it was found out that strength exercises affect the optimal level in improving VO2max. References: Ozaki. H, Jeremy P, Loenneke Robert S, Thiebaud Takashi A, (2013). Resistance training induced increase in VO2max in young and older subjects, European Review of Aging and Physical Activity.

IMPACT OF RECREATIONAL FITNESS TRAINING PROGRAM ON DYNAMIC STRENGTH OF WOMEN.

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Introduction: Within the framework of previous research, topic of recreational fitness programs was discussed in Cvetkovic (2003), Kloubec (2005); Obradovic, Cvetkovic & Kalajdzic (2008), Borer (2008) and the aim of their research was to investigate the effects of fitness exercise (Pilates, Tae-Bo, aerobics) on the strength of the abdomen and lower back, abdominal muscle endurance and flexibility of the lower part of back in adult women. The research problem is to analyze the effects of application of fitness exercise program on the dynamic strength of women. The paper deals with dynamic strength. The aim of the research is pointing to the possibility of increasing the dynamic strength of women who are engaged in recreational exercise for just 10 weeks. Method: We used a battery of five motor tests (Push-ups to the body, Pull-ups while hanging on the shaft, Sit-ups in 30 s, Flexion of legs for 30 s, and Squats on both legs 30 s). The total sample in the study consisted of 59 respondents (of 22-60 years of age), of which N = 30 respondents is from experimental groups, which have applied the method of group fitness exercise and N = 29 respondents from the control group, which did not apply Pilates method of exercise. Results: With the help of multivariate analysis of covariance (MANCOVA) it was found that there are statistically significant differences between the experimental and control groups in three of five mobility variables in favor of the experimental group (p=0.00). In general, it can be concluded that the application of experimental treatments for 10 weeks, lead to increased, improved results in variables Push-ups, Trunk flexion in 30 s, and Pull-ups, in respondents from the experimental group. Discussion: The obtained results confirm the expected transformation capabilities provided by organized physical exercise and confirm previous results from Obradovic and associates (2008). By observing the work so far and expectations for future experimental programs of a similar type of exercise, for women who want to reach their objectives and results of each session, it can be expected to improve their physical and mental health as well as to further progress in terms of strength, which will enable better life. References: Borer, K. (2008). Koliko je tjelovežba učinkovita u poticanju gubitka masnog tkiva. Kineziologija, 40, 2, 127-138. Cvetković, M. (2003). Efekti različitih modela kružnog treninga na razvijanje snage U Zbornik

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History

HISTORICAL DEVELOPMENT OF SKIING: CASE STADY IN DURMITOR AREA.

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Introduction: The objective of this study is the history of skiing, while the main goal will be the historical development of skiing in the mountain Durmitor area in Montenegro. The study consists two goals. The first goal is the emergence of the first ski in the Montenegro and benefits that are brought. The second and the main goal is the occurrence and development of skiing and ski sports in the territory of mountain Durmitor. Method: During the making of this study, the authors used descriptive method with consulting of competent literature. The previous authors' experience in this field was also so useful. Moreover, the author used the analytic method and parallel method that is the most productive if you make some inferences about some appearance. Results: The main outcome of this study was showing of historical progress of ski sports in the territory of mountain Durmitor from early beginnings to the modern Olympic skiing. Discussion: Skis and ski sport were early appeared in the region of Mount Durmitor. The mountain and the region around it are very rich with slopes with Olympic diameter, with plenty of snowfall and long winters. However, lack of financial investment, channeling money to other centers, led to the fact that the skiing in this area is at a low level. References: Paunić SM (1992). Kapetan Henrich Angel: Kroz Crnu Goru na skijama, Cetinje-Titograd, 1991. Fizička kultura, 46(1), 66-67. Milasinovic, R. (2002). Razvoj skijanja na Durmitoru, unpublished bachelor thesis. Srpsko Sarajevo: Faculty of Physical Culture.

Motor Learning

EFFECT OF MORPHOLOGICAL CHARACTERISTICS AND MOTOR ABILITIES ON THE EXECUTION OF TECHNICAL ELEMENTS IN ALPINE SKIING.

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Introduction: Considering the fact that skiing is the sport of reflex and balance implies that skiers have to be constantly active and possess compatibility of whole movement apparatus (Hadzic, 2008). Methods: The testing was conducted on 35 participants who are regular students of the Faculty of Sports and Physical Education in Niksic and who attend regular classes of skiing. The predictor system of variables has been represented by 9 morphological measures (body mass, mean circumference of chest, thigh circumference, body height, lower leg length, arm length, knee diameter, shoulder width, and

pelvic width). Also, it included 8 motor skills (hand tapping, foot tapping, bending - touching, balancing with closed eyes, balancing with opened eyes, agility in the air, side steps, and backward polygon). The criterion system of variables has been represented by 4 situational motor tasks (leaning downhill, turning toward a slope, V- turn, basic wriggling). Based on achieved results the basic, descriptive statistical indicators have been calculated such as: range - Range, minimum - Min, maximum - Max, arithmetic average - Mean, standard error of arithmetic mean - Std. Error Mean, and standard deviation - SD. Results: Based on the results of a regression analysis, it is obvious that the system of 17 predictor variables (9 morphological and 8 motor) has achieved a statistically significant impact on the efficiency of the ski technique performance. Those include two out of four situational motor tasks: V- turns and the basic wriggling (according the criterion system). On the other hand, the same system of 17 predictor variables has not achieved a statistically significant effect on the efficiency of execution of technical elements of a ski technique in two situational motor tasks, which are leaning downhill and turn towards the slope. Discussion: Based on the results of the conducted research on 35 students we can conclude that there were no statistically significant effects of predictor variables on criterion variables of situational motor abilities. Throughout this research, eight tests of motor skills and nine tests of morphological characteristics, as a part of the system of predicator variables, have been applied with the aim to determine their influence individually on each of 4 applied motor tests for assessment of situational motor abilities. Therefore, the further, future researches should be conducted on the larger group of participants. References: Hadžić, R. (2008). Tehnika i metodika alpskog skijanja. Rožaje: Autorsko izdanje.

METHODS FOR EVALUATION OF SOME PSYCHOMOTOR ABILITIES.

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Introduction: Contemporary research in the field of psychomotor abilities of a man are focused on discovering legalities determining motor behaviour by which they contribute to improvement of sports results. Individual movements in the whole are the product of neuropsychological activity whose characteristics determine the structure of motor abilities. Each movement reflects increased number of elements, such as: irritation of receptors, transfer of impulse to the processing centre and activation of nerves innerving the muscles whose contraction causes movement. Methods: Evaluation of psychomotor abilities is commonly used by test-devices, of which we will mention the way of work and use of those most commonly used. -Reaction meter is a device used for the analysis of examinees` reactions during emission of visual and auditive lure, in which the examinee is asked to answer droningly to the lure, or in constituent reaction to adjust their answer to the given lure in the advance required manner. Tremor meter is a device made to measure stability (tremor) of a hand. Task of the examinee is to pull a metal peak through openings of different diameters, without touching their edges. Touch of the edge closes a circuit which is automatically registered on the numerator. Sinusoidal test-device is made for examining hand ability and oculomotor coordination. Task of the examinee is to pull a metal disk from the beginning to the end of the sinusoidal rabbet as fastas possible and with the fewest touches as possible. -Dotting-test was also made for measuring psychomotor accuracy and velocity, but it is also the test of emotional stability. Results: By factor analysis of psychomotor abilities the following agents of its efficacy were isolated: -Precise control of arms, hands and legs control in objects manipulation. Coordinated work of arms and legs in small and big movements. Psychomotor orientation based upon fast reaction and accurate evaluations of the movement direction. Simple velocity of massive movements of hands, disregarding

precision. Abilities of aiming and firing referring to visual-motor targeting. References: Barrett,P. (2003). Beyond psychometrics –Measurement, non-quantitative structure, and applied numerics. Journal of Managerial Psichology 18(5), 235-241. Biro,M.(1995). Dijagnostička procena ličnosti, Futura publikacija i Filozofski fakultet , Novi Sad, 14-16.

Neuromuscular Physiology

THEORIES OF TIREDNESS IN SPORT.

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Introduction: Classic theories interpret the phenomena of tiredness as a consequence of biochemical changes appearing in the whole organism or in active organs. Physiological nature was primarily related by the scientists to lack of oxygen and other nutritional material in blood or blood plasma that `feeds` muscles. Also, in the scope of those interpretations, tiredness is related to loading of different waste material and metabolism products. On those bases, three classical theories were founded, such as: theory of suffocation, theory of exhaustion, and theory of saturation, united in one general name as hormonal theories of tiredness. For explanation of mental tiredness, central brain theory of tiredness is dominantly used. Hormonal theories of tiredness: Theory of suffocation-starts for the fact that every cell needs oxygen to work, which in the process of metabolism provides tissue breathing. Muscular cells use oxygen during their work to perform contractions though which the major part of physical work is done. Theory of exhaustion-starts from the fact that the tiredness appears as a consequence of spending and exhausting all disposable reserves of energetic material. Intoxication theories-starts from the fact that the work that lasts longer, or it is harder than it can be regulated by the aerobic capacity of the person, and it includes unaerobic capacities conditioning gradual loading of waste products because the bloodstream is unable to remove them on time. Although the proofs for the above mentioned hormonal theories are found in laboratory conditions, it was soon proved that generalization of such findings on the whole organism was unjustifiable. Activation theories of tiredness. Lately, with broadening of findings on the role of reticultural formation and other brain structures responsible for sleeping and wakefulness, activation theories of tiredness are developed and they, besides physical, start emphasizing the mental tiredness as well. Centrally brain theory of tiredness-is dominantly used for explanation of mental tiredness. Supporters of this theory have given a series of convincing proofs that tiredness in the human organism is a complex phenomenon that cannot be explained only with hormonal changes in blood and muscles. They consider that appearance of tiredness and its characteristics can be explained on the base of the findings on neurophysiologic changes that happen in CNS. References: Blakemore, C.(1997). Mehanisms of mind, Cambridge University Press, Cambridge, 69-75. Cohen,D.H.(1986). Coming age of neuroscince. Tins, 9, 1-3. Luria,A.R.(1976). The Working Brain, The penguin press, London,121-127.

Nutrition

WAIST CIRCUMFERENCE AS AN INDICATOR ABDOMINAL OBESITY IN MIDDLE AGE.

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Introduction: In the 21st century we face with the global epidemics of obesity, diabetes and heart disease, including hypertension. One of the five criteria of the metabolic syndrome is and abdominal (central) obesity. Highly specific anthropometric indicator of central obesity in adults is waist circumference (WC). According to the World Health Organization waist circumference over 102 cm for men and 88 cm for women is a boundary that requires immediate weight reduction. Methods The study included 297 subjects, middle aged from Montenegro, 137 (46.12%) male and 160 (53.88%) of the respondents were female. Waist circumference was used as anthropometric indicator of abdominal obesity. Waist circumference is precisely measured centimeter tape, midway between the last rib and the top of the iliac bone (top of the hip bone to hip) as recommended by the World Health Organization. The data werw analyzed by statistical methods, using the statistical software STATISTICA for WINDOWS. Results: Based on the results of research that included 297 subjects, middle aged, 95 (32%) patients had normal nutritional status.101 (34%) of the respondents have excessive nutritional status, and the same number of respondents 101 (34%) are obese. In a sample of 137 male subjects, normal nutrition has got 44 (32.1%) of the respondents, excessive nutritional status, 52 (37.9%) and obesity was 41 (30%) patients. From 160 female subjects, normal nutrition has got, with 51 (31.9%) of respondents, excessive nutritional status of 49 (30.6%) and obesity was 60 (37.5%) of the respondents. Discussion: Analyzing the results of our research, more than worrying fact is that two-thirds of the population studied in middle age more and more people are into the problem of over-nutrition and obesity. It is estimated that in the world today, about one billion people are overweight, and about 300 million obese (WHO, 2000). Recent studies in adults in Sri Lanka (Katulanda et al., 2010) found a high prevalence of overweight and obesity, especially abdominal obesity. Research conducted before 1989 showed that in developing countries, obesity is associated with higher socioeconomic status and represents a disease of the richer classes, while in developed countries the trend is reversed (Monteiro et al., 2004). References: Katulanda, P., Jayawardena, MA., Sheriff, MH., Constantine, GR., & Matthews, DR. (2010). Prevalence of overweight and obesity in Sri Lankan adults. Obes Rev; 11(11): 751-756. Monteiro, CA., Moura, EC., Conde, WL., & Popkin, BM. (2004). Socioeconomic status and obesity in adult populations of developing countries: a review. Bull World Health Organ; 82(12): 940-946 World Health Organization. (2000). Obesity: preventing and managing the global epidemic. Report of a WHO Consultation (WHO Technical Report Series 894). Geneva: World Health Organization.

Physical Education and Pedagogics

THE EFFECT OF FELLOWSHIP AND OPPOSITE SEX FRIENDSHIP ON REGULAR

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Introduction: Physical activity (FA) is defined as muscular or physical work leads to consumption of energy over the resting level, and have a positive impact on human health which was proven by many

studies and clinical trials. This study which was directed to determine the relationship between positive and negative habits of the social environment was conducted to examine the effect of fellowship on regular physical activity and cigarette smoking habits of individuals living in Adana region. Methods: The sample of the study consist of, 237 women and 316 men total 553 adult volunteers between 16-40 years of age living in Adana region. The average ages of male and female participants are 22.30 ± 4.44 and 23.67 ± 5.88, respectively. Participants with their two closest friends of the same sex and opposite sex for at least 30 minutes per day at least three days a week having regular physical activity habits and daily cigarette consumption information were collected. Results: Generally the average height, body weight and BMI values vary depending on gender. Both for the men and women smoking habits and regular physical activity levels the impact of fellow friends, seems larger than the opposite sex. Discussion: Male and female participants regular physical activity participation rate, is significantly different from the same sex and opposite sex friends. Both male and female participants' participation in physical activity levels showed significant correlation at higher levels. It is observed that males choose men and female having more activities as their friends whereas physical activity participation rates of opposite sex friends of male participants are higher than the same sex physical activity participation rates. It has been reported by many researchers participating in physical activities with more togetherness with friends and young people being a member of a sports team. (Duncan, Duncan, and Strycker 2005; Salvy et al. 2009). Physical activity participation of young people is clearly having positive effects by accompanying friends (De Bourdeaudhuij et al. 2005). Smoking rate for men is lower than fellow friends in the same sex but significantly greater than the second female friend. Women's smoking rates are similar to fellow friends but lower than friends from the opposite sex. Chip (2014) in his study mentioned that individual has a tendency to choose friends who smoke having a similar attitude.

Physiology

SPORTS CAREER OF STUDENTS-ATHLETES .

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Introduction: The general belief about top athletes is that they invest a lot of effort into achieving sports results and sports career, while at the same time they fail to develop good decision-making skills about their career. To be successful, the athletes already at a young age need to devote their time and energy almost exclusively to trainings and competitions, often this happens at the expense of education, leading to the abandonment of the sport and giving priority to education and preparation for future job opportunities. The aim of the study was to determine the characteristics of different levels of career development in students-athletes. Methods: The study included 85 students-athletes (56 men, 32 women) aged 18 to 25 years (M = 19.74, SD = 1.01). All of them were first year students at the Faculty of Sport and active athletes. The questionnaire Students-athletes and Transition to University (SATU) was developed for the purposes of this study (Cecić Erpič, in press). The instrument is intended to establish the characteristics of adapting to the senior level of sport, which coincides with the entry to university. The questionnaire is based on the holistic model of sports career development (Wylleman and Lavallée - 2004) and observes the characteristics of sports, psychological, psychosocial and educational level of career development. For the preliminary data analysis we used descriptive statistics. Results: Analysis of the questions, aimed at identifying system characteristics of coordinating a dual career, shows that the participants are very

consistent in their criticism of the system. They evaluate the university system for students-athletes as bad (M = 1.95) and inflexible. Discussion: Analysis of the open-ended questions showed several complex and system-related determinants that hinder the effective coordination of education and sport. This includes mandatory attendance at study obligations (n = 25), problems with unadjusted schedule (n = 14), the shortage of exam periods (n = 18) and lack of individualized approach (n = 11). References: Wylleman P, A. D. & L. D. (2004). Career transitions in sport : European perspectives , Psychology of, 5(1), 7–20. Corrado, L., Tessitore, A., Capranica, L., Rauter, S, DouponaTopic, M. (2012). Motivation for a dual-career: italian and slovenian student-athletes. Kinesiologia Slovenica;2012, Vol. 18 Issue 3

Rehabilitation

RELATIONS BETWEEN BIOMECHANICAL PARAMETERS AND STATIC POWER OF ARMS IN CHILDREN WITH DISTURBED POSTURE.

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Introduction: Any deviation from the standard dimensionality when it comes to parameters of biomechanics and anthropometry can clearly lead to disturbed poor posture, and thus lead to muscle inefficiency from the aspect of motor functioning (Adar, 2004; Gandreault, Ansenault, Laviere et al., 2005; Yilkoski, 2005). The aim of this paper is to determine the biomechanical parameters and analyze their impact on static power of arms in children with disturbed poor posture in the form of kyphotic disturbed posture, lordotic disturbed posture and children with flat feet. Methods: Transversal survey was performed on a sample of 67 children within the territory of the municipality of Subotica. Method procedure included an assessment of the static strength of arms and shoulders, and a measurement of biomechanical parameters. For the evaluation of static strength of arms and shoulders a standardized “bent arm hang” (s) test was applied according to the model of Bala, Stojanovic & M. Stojanović (2007). Regression analysis was used for determining the influence of a set of biomechanical variables, which represented predictor variables, on the motor variable, which was a criterion variable. Results: Based on the values of descriptive statistics of biomechanical variables, we can state the balanced growth of longitudinality of skeleton in all three subsamples considered through variables: Body height, Sitting height, Upper arm length, Forearm length and Arm length. In reviewing the results of a regression analysis of the criteria “Bent arm hang” it can be seen that there is a statistically significant effect of the system of predictor variables on the criterion variable in subjects with disturbed kyphotic posture (P=0.00). Discussion: Results of regression analysis have pointed to the fact that the predictor variable Body weight showed a statistically significant negative effect on the static strength of arms and shoulders in respondents with kyphotic poor posture. In addition to the weaknesses of their body musculature, especially of the arms and shoulders, increased body weight has additionaly impaired the possibility of achieving better results in the above test. References: Adar, B. Z. (2004). Risk Factors of Prolonged Sitting and Lack of Physical Activity in Relate to Postural Deformities, Muscles Tension and Back ache Among Israeli Children. A clinical crosssectional research. Doctoral Thesis, Semmelweis University Budapest. Bala, G., Stojanović, M. V. & Stojanović, M. (2007). Merenje i definisanje motoričkih sposobnosti dece. Novi Sad: Fakultet sporta i fizičkog vaspitanja. Gandreault, N., Ansenault, B., Laviere, C. et al. (2005). Assessement of the paraspinal muscles of subjects presenting idiopathic scoliosis. BMC Musculosceletal Disorders, 6:14. Yilkoski, M. (2005). Growth and progression of adolescent idiopathic scoliosis in girls. Jornal Pediatr Orthoped B, 14(5):320-324.

Sociology

THE DOMINANT GENDER IN SPORTS ANALYSIS (THE CASE OF TURKEY).

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Introduction: Modernization and global communication have reached to the extent of determining the way of life of humankind in many different areas. This fact has effected the perceptions of people from different majors varying from politics to sports. The aim of this research is to find out people's perceptions of sport activities by bearing in mind the social determiners like; age, gender and education level. Methods: In this study 15 questions addressed to 742 people in a questionnaire. Survey, based on Istanbul's population data, is applied on illiterately individuals, who are over 20 years old by using, quota sampling. Results: Male is the dominant power in the sport. Skiing, Tennis, Swimming and Table Tennis is no dominant gender. Basketball, riding and golf are attributed to both sexes. Basketball, riding, golf, volleyball, figure skating is no dominant gender. Boxing, Wrestling, Football is indisputably the dominant male gender. Judo, Taekwondo, Aikido is no dominant gender. Women are the dominant gender in artistic gymnastics and step aerobics / fitness. Discussion: According to our research, it was found that differences in the image of the sport (Şallı,2009). This difference is seen in the case of dominant gender. Gender-worthy sports were found. As in other studies we've identified the secondary position (Koca, 2006) of women in sport. Women are more prone to aesthetic sports and men is more prone to sports-based power stemming from biological differences (Koca C, Bulgu N 2005). The transition to modern conventional structure, changes occur in society's value properties (Amman MT, 2006). Every change, depending on the speed and rhythm changes more or less, but it is always a painful process (Amman MT, 2005). Sports is positioning its image in the society due to the impact of social determinants such as gender. References: Şallı AO (2009). Changing Images of Sports on the Axis of Social Determinants, Marmara University Health Sciences Institute Master's Thesis, İstanbul. Koca C (2006). Gender Relations in Physical Education and Sport, Hacettepe J. of Sport Sciences, 17 (2), 81-99, Ankara. Koca C, Bulgu N (2005). Sport And Gender: An Overview, Science and Society, 103, 163-184. Amman MT (2006). Social Dynamics of Mass Sports. Çamlica Publications, İstanbul. Amman MT (2005). Women and Sport. Morpa Culture Publishing, İstanbul.

COMPARISON OF PROFESSIONAL FOOTBALLERS WITH REGARD TO INTENTED USE OF SOCIAL NETWORK: RESEARCH OF FACEBOOK.

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Introduction: Footballers, who take part in Social Media, can share information about their matches, their conditions of disability, and their states of mind. Even they can express their reactions about social events in terms of this sharing. They can share everything both in personal and in the area of football. In this study, it is aimed to reveal that differences in the use of Social Network in terms of age, educational background, period of professionalism, levels of league of Professional Footballers. Methods: In this study, there will be taken a poll to measure intended purposes of Social Network and

the field of application for this poll is 300 Professional Footballers who are between 18-35 years old and play football in Super League, 1st League, 2nd League and 3rd League. Results: In consequence of the assessment of the polling data, the Professional Footballers who play football in Super League, 1st League, 2nd League and 3rd League, there is seen differences their intended purposes of Social Media. Furthermore, the intended purposes of Social Media vary from age to age. Discussion: In parallel with the qualifications which Social Network provides for users, it can reach broad user communities. Its reaching broad user communities, draw attention of researchers who study in different disciplines/ departments such as Psychology, Education, Management, Marketing, Sociology, Anthropology and Medical even if there are different reasons for researchers. Around the world, intended purposes of Social Network, which are used intensely, differentiate from person to person (Akyuz, 2012). References: Akyuz, H. I., et all (2012). Teacher Candidates' Social Network Usage Tendencies: A Qualitative Investigation. Procedia - Social and Behavioral Sciences, 46, 5402-5408.

MIGRATIONS IN SPORT: ANALYSIS OF TRANSFERS OF SLOVENIAN MALE HANDBALL PLAYER'S (2005- 2015).

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Introduction: Migration is a way for people to search for better living conditions. Over time, as the sports industry has commercialized and globalized, more and more athletes and coaches have started to cross borders in search of better living conditions. Sports migration has become a living phenomenon of globalization as well as a form of employment. It has also brought the attention of researchers (; Agergaard, 2014; Maguire, 2011), especially in Europe and all over the world (Poli and Besson, 2011). The problem of the study was an analysis (reasons for transfer, duration of transfer and the subjective evaluation of their success) of transfers in Slovenian men's handball. Methods: Basic data, obtained from the EHF base: start and finish release, country from and country to) and socio-demographical characteristics: age and gender. Open interviews have been carried out with 6 Slovenian players (average age 28,4 years; min:18 max: 39) who have been playing abroad in 2014/15 season or before). Results: In studied competitive season 70 Slovenian handball players played abroad, 57 were men (81.4%)- Men handball players were most often playing in Spain, Austia and Germany. Most of them (5) have stated that they have vision to be professional handball player and sign good contract. Some of them wished to change the environment, as they did not consider having possibilities for personal and professional development in Slovenia anymore. Some oldest players have looked for possibility to maximise their pay towards the end of their careers. In average, these players have changed two clubs abroad. Discussion: Main reason for increased number of migrations are general changes in the society and globalisation, changed social ways of life; the second main reason is an increase of the qualitative level of top level handball. The basic motive beside good pay for players is also changing the setting and getting to know new cultural environments- for family. References: Agreraard S, Ryba T. V Migration and Career Transitions in Professional Sports: Transnational Athletic Careers in a Psychological and Sociological Perspective. Sociology of Sport Journal, 2014; 31: 228-247. Doupona Topič M, Bon M. The paths of migrations of handball in Europe. In: Doupona Topič M and Ličen S. (eds.) Sport, culture & society. An Account of Views and Perspectives on Social Issues in a Continent (and Beyond). Ljubljana: Faculty of Sport, 80-84; 2008. Maguire J, Falcous M. Sport and Migration: Border, Boundaries and Crossings. New York: Routledge Press; 2011. Poli R, Besson R. From the South to Europe. A comparative analyses of African

and Latin football migration. In: Maguire, Joseph J, Falcous M. (Eds.), Sport and Migration: Border, Boundaries and Crossings. Routledge, 15-30; 2011

Sport Management

ETHICAL DILEMMAS OF SPORT ADVERTISING.

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Introduction: The objective of this study represents the sport advertising, while the main goal will be directional to explaining the ethical dilemmas of sport advertising. The main tasks of this study are, the first discussing the advertising activities nowadays and newly created ethical dilemmas as well as drawing attention to the specific nature of the sport advertising as a separate field of advertising in general. Method: During the making of this study, the authors used descriptive method with consulting of competent literature. The previous authors' experience in this field was also so useful. Moreover, the author used the analytic method and parallel method that is the most productive if you make some inferences about some appearance. Results: From the reason sport advertising did not develop separately, it is the fact that it represents an integral part of the overall advertising; however, sport advertising has much stronger ethical dilemmas, mostly due to the reason, sport industry has much more unpredictable nature than most of other industries. This study made general retrospection of common characteristics and differences among sport advertising and advertising in general that might be relevant for many researchers in this area. Discussion: Sport advertising is developing rapidly around the world (Bjelica & Popović, 2015), the dominant example of this development is most evident in the "advertising industry" in the United States (Popović, 2011). However, the sport advertising is not at the expectable level in Montenegro (Bjelica & Popović, 2015), while the ethical dilemmas might be more prominent. Hence, some further knowledge regarding the ethical dilemmas collected in this study might improve the contemporary situation and help the current and potential advertisers to invest in sport industry in Montengro. References: Popović S (2011). Reklamiranje u sportu kao efektivno sredstvo savremene poslovne komunikacije (Unpublished doctoral dissertation), University of Novi Sad, Novi Sad. Bjelica D, Popović S (2015). Sport Mont, 43,44,45/XIII, 35-41.

Sports Medicine

LATARJET STABILIZATION OF RECURRENT SHOULDER JOINT LUXATIONS EXPERIENCED BY SPORTSMEN.

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Introduction: Sportsmen, who are engaged in sports above their heads, often experience micro traumas, as well as injuries of labral ligamentous complex of shoulders. Anterior shoulder sprain most often results in injury of anterior labral complex, where injury of anterior labral boundaries and detachment

of joint capsule from anterior part of labrum occur. If luxations are recurrent, serious injuries of anterior part of glenoid labrum can occur. The aim of this retrospective study is to estimate the functional result and stability of humerus scalpula joint after applying Latarjet process with sportsmen. Methods: Within period between 2009 and 2014, 7 patients with recurrent anterior luxations of shoulders and injuries of glenoid labrum got operated by using Latarjet – Patte method. This sport group was consisted of 5 men and 2 women, with the average age of 24. latarjet method is done by an open technique, by osteotomy of coracoid epiphysis and relocation onto anterior glenoid boundary by fixating 2 screw bolts. Results: The functional results were estimated after4, 6, 8 months after surgery, by using Constant score and the average value was 71 points. Returning to earlier sport activities was notified in 5 cases and 2 persons continued the engagement in sport recreation activities which do not require the usage of dominant hand. Discussion: Latarjet open method with minimal surgical aggression makes conditions for repairing function and stabilization of shoulder with full motion span after treating recurrent anterior luxations of shoulder with the loss of bone mass. References: Lafosse, L. Lejeune, E., Bouchard A Kakuda, Kochhar, T. (2007). The arthroscopic Latarjet procedure for the treatment of anterior shoulder instability. Arthroscopy, 23, 1242-1245. Second Arrigoni, P. Hubert, D. Brady, P. C. Weber, I. C, Burkhart SS.(2008). The value of arthroscopy before an open modified Latarjet reconstruction. Arthroscopy, 24, 514-519.

RECONSTRUCTION OF ANTERIOR CRUCIATE KNEE LIGAMENT OF SPORTSMEN BY USING RIGIDFIX CURVE PIN SYSTEM.

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Introduction: The aim of this work is to display advantages of femoral fixation STG (semitendinosus, gracilis) of a graft by using the advanced Rigid fix curve PIN system to reconstruct anterior cruciate knee ligament. Methods: Within period 2013- 2015, fifty three patients got operated by the method of femoral fixation in Orthopedic Trauma Clinic of Montenegro. Rigid fix curve PIN system was designed for using anteromedial (AM) portal, gives very strong fixation by two bioresorbable pins, and reduces micro movements of a graft (transplant) inside the femoral tunnel, amplifying the bone contact to 360 degrees. Results: Subjective (Lysholm) and objective clinical parameters were used during estimation of effectiveness of this method. All patients operated were controlled after 2, 6 and 12 months and the study showed that 87% patients scored excellent postoperative Lysholm results, 10% of them scored good and very good results and 3% of patients showed satisfying results. Postoperative axle closure- pivot point at 0.5% and Lachman 1+ at 10 % of respondents. Complications concerned with this series were not noticed. Discussion: The former experience and advantages which Rigidfix curve PIN system provides by using this technique, help to achieve stability and compression in the femoral tunnel, which qualify the applied system to be recommended for treating the harmed anterior cruciate ligament. References: Liu YJ, Li HF, Wang JL, Wang ZG, Li ZL, Wei M, Cai X, Zhu JL. (2009). Rigidfix tibial and femur cross pin system used for hamstring grafted anterior cruciate ligament reconstruction. Zhonghua Yi Xue Za Zhi., 89(29), 2034-2037. Mark V. Paterno, M. J. Rauh, L.C. Schmitt, K.R.Ford, T.E. Hewett (2014). Incidence of Second ACL Injuries 2 Years After Primary ACL Reconstruction and Return to Sport. Am J Sports Med., 42, 1567-1573.

Training and Testing

THE EFFECTS OF THE TRAINING IN THE PREPARATION PERIOD ON THE REPETITIVE STRENGTH TRANSFORMATION WITH CADET LEVEL FOOTBALL PLAYERS

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Introduction: The main aim of the research was to identify a level of quantitative changes of the repetitive strength with fifteen 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 in a two timely different points a quantitative changes of the repetitive strength under the influence of the programmed football training with fifteen years old football players, which involved a summer preparation period of forty-two days. The training programme covered forty-four training units. The research was made on a sample of 120 cadet level football players. To estimate the agility three tests have been used: Lying-sed for 30 seconds, Push-ups and Lifting upper body while lying on stomach. In the area of comparative statistics, for determining differences in the variables used to estimate the repetitive strength at the beginning (initial state) and at the end (final state) training program in the preparation period 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 repetitive strength. This confirmed the hypothesis that the expected significant positive quantitative changes of basic-motor abilities influenced by the proposed model of training in preparation period with fifteen 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 basic-motor abilities level with fifteen years old (Gardašević et al., 2012; Gardašević & Bjelica, 2014). This training model is brought to a significant increasing the level of repetitive strength. 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. References: Bjelica, D. (2005). Sportski trening i njegov uticaj na antropomotoricke sposobnosti fudbalera cetrnaestogodisnjaka mediteranske regije u Crnoj Gori. Sport Mont, (8-9), 26-41. Gardašević, J., Georgiev, G., Bjelica, D. (2012). Qualitative changes of basic motor abilities after completing a six-week training programme. Acta Kinesiologica, 6(1), 70-74. Gardaševic, J. & Bjelica, D. (2014). Efekti rada u pripremnom periodu na brzinu vođenja lopte petnaestogodišnjih fudbalera. Sport Mont, 40,41,42/XII, 160-166.

INFLUENCE OF THE SPORTS TRAINING ON THE TRANSFORMATION OF MOTOR ABILITIES OF VOLLEYBALL AND HANDBALL.

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Introduction: The system of sport in the world is experiencing continuous deep qualitative, quantitative and structural transformations, which stem from the recent social, economic, political and technological conditions for the development of society (Malacko and Rađo, 2004). Motor skills are called one man's ability to participate in solving motor tasks and conditional on the successful movement, regardless of whether they were acquired training or not (Zaciorski, 1975). To achieve a high level of performance of an

element, the player is required not only technical training, tactical skills, but also the expression of a high level of motor abilities explosive power, speed and agility (Ziv and Lidor, 2010). Methods: Testing was conducted Eurofit tests on a sample of 15 respondents handball RK Sutjeska - seniors, and a sample of 15 volleyball - volleyball team faculty of philosophy Niksic. Respondents are not warmed up prior to testing. The motor area is estimated to 8 tests: 1) Flamingo - balancing test, 2) hand tapping -speed alternative movement, 3) bent with outreach to sit, 4) Long jump, 5) hand dynamometry, 6) Lying - Sit down for 30 seconds, 7) endurance in pull-ups, 8) pin running 10x5. Based on the test results to calculate basic descriptive statistical parameters: arithmetic mean - X, standard deviation - SD, max - MAX and the min - MIN. Results: Display of the test results, which are grouped in the statistical series serves for better visibility and easier spotting of differences motor abilities. Each subgroup consists of 15 respondents were statistically processed values the values of each of the 8 variables individually. The first group consists of 15 handball RK Sutjeska seniors from Niksic, while a second group of 15 volleyball players, volleyball team faculty of Philosophy. Discussion: On the basis of your answers and analysis of the results obtained to calculate basic descriptive parameters we can conclude that there are significant differences in the following tests: bend from reaching the Seat in favor of handball; jump from place to place in favor of volleyball; tethered hands - hands result aside handball; Lying - seater 30 seconds in favor of volleyball, and endurance in pull-ups in favor of volleyball. References: Malacko, J. i Rađo, I. (2004). Tehnologija sporta i sportskog treninga. Sarajevo: Fakultet za sport i tjelesni odgoj. Zaciorski, V. M. (1975). Fizička svojstva sportiste. Beograd: JZFKM. Ziv, G., & Lidor, R. (2010). Vertical jump in female and male volleyball players – A review of observational and experimental studies. Scandinavian Journal of Medicine and Science in Sport, 20, 556-567.

LOWER-LIMB ASYMMETRY AND EXPLOSIVE STRENGTH UNDER FATIGUE IN YOUNG SOCCER PLAYERS.

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Introduction: In order to prevent from injuries, professional soccer players learn to use both legs and try to reduce lower limb asymmetries, which are persistent in young and intermediates (Fousekis et al., 2010). Daily-living use and lateralized motor experiences lead to sidedness developmental changes, since the Non-Dominant Leg (NDL) works to stabilize and ensure power, while the Dominant Leg (DL) assumes skill tasks; this asymmetry pattern is stable through motor development stages (Teixera and Teixera 2008). Resulting asymmetries derive in lower-limb differences in Strength, Rate of Force Development, or even tolerance to fatigue, augmenting the risks of injuries in young players. Recent studies show that Bosco jumps are able to determine functional asymmetries in this population (Sannicandro et al., 2013). In order to deepen on asymmetry dysfunction concerning fatigue, we compared bilateral [2L] and unilateral [DL & NDL] Squat Jump and Countermovement Jump [SJ & CMJ]), immediately before and after the 7*35m Svensson & Drust Repeated-Sprint Test, where 25 s of recovery should not be time enough to avoid fatigue. Methods: Optojump system platform (Microgate, Italy) was used to test asymmetry in 9 young top-regional male soccer players (15±1 years, Villarreal CF), after legal written consent. Players displayed a pre-fatigue bout of 18 jumps [3*SJNDL+3*SJDL+ 3*SJ2L plus 3*CMJNDL+3*CMJDL+3* CMJ2L] interspersed with 30 s within jumps and 120 s within SJ and CMJ (Meylan et al., 2010). 3 min after they made the 7*35m RSA test, followed by 5 min recovery and the post-fatigue bout of jumps. A two-ways ANCOVA (Asymmetry[3] * Fatigue[2]), with repeated measures in the second factor and Injuries as Co-Variable was conducted, choosing the best jump in each modality. Results: Bilateral jumps (SJ2L&CMJ2L) were significantly higher than unilateral,

with no significant differences between DL and NDL. Regarding the interaction Fatigue*Asymmetry, data showed an overall impairment post 7*35m test, although only CMJDL (23.59±4.78 vs 21.23±2.19) trended to signification (p=0.063). As expected, CMJ was always better. Discussion: Previous studies propose that DL is stronger due to most efferent neural impulses, and therefore more susceptible to fatigue (Sanders et al., 2011). CMJDL has come closer to a significant impairment post-fatigue, pointing to a harder implication in running. Lack of efficiency in unilateral jumping or low experience in all-out running tests might be limiting factors. References: Fousekis, K., Tsepis, E., & Vagenas, G. (2010). Journal of Sports Science & Medicine, 9(3), 364-373. Meylan, C. M., Nosaka, K., Green, J., & Cronin, J. B. (2010). Journal of Sports Sciences, 28(5), 545-554. Sanders, R. H., Thow, J., & Fairweather, M. (2011). Journal of Swimming Science, 18. Sannicandro, I., Rosa, R., De Pascalis, S., & Piccinno, A. (2012). Science & Sports, 27(6), 375-377. Teixeira, M. C. T., & Teixeira, L. A. (2008). Developmental psychobiology, 50(8), 799-806.

THE CORRELATION BETWEEN OXYGEN UPTAKE AND THE SPECIAL JUDO FITNESS TEST IN FEMALE JUDOKAS.

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Introduction: Judo has been characterized as a high-intensity intermittent combat sport, consisting of many different techniques and actions employed during a match (Drid et al., 2012). High level of strength and coordination is needed to overcome the adversary through rapid execution of technical maneuvers throughout the match (Drid et al., 2010). In addition to faster recovery process after high-intensity intermittent activity associated to aerobic performance (Drid et al., 2009; Franchini et al., 2011; Drid et al., 2015), some evidence exists for higher values of maximal oxygen consumption in judokas who are able to win points in the decisive moments of bout. The aim the study was to compare physiological responses during arm and leg aerobic power tests. Methods: Ten elite female judokas of the Serbian National Team participated in the study. In addition to the Special Judo Fitness Test, maximal oxygen uptake and anaerobic threshold were determined using an arm crank ergometer and a treadmill. Results: The VO2max was higher on the treadmill than in the arm crank, the AT was also higher on the treadmill test. Nevertheless, the SJFT results were significantly correlated only with the maximal heart rate during the treadmill test. Body fat percentage was correlated with VO2max and AT in the arm crank test. Discussion: The maximal oxygen uptake was not statistically correlated with the SJFT results in elite female judokas. However, judokas who had higher maximal heart rate during the treadmill test, showed a worse judo-specific capacity on the SJFT. Female judokas with higher body fat seem to have lower VO2max and AT, with statistically significant correlations in the arm crank, and close to significance on the treadmill. On the other hand, arm crank and treadmill tests presented different results concerning aerobic capacity. References: Drid P, Maksimović R, Matić R, Obradović B, Milošević Z, Ostojić SM (2009). Fitness profiles of elite female judokas of the Serbian national team. Med Sport, 62(3), 251-263. Drid P, Bala G, Obadov, S (2010). The differences in motor and cognitive abilities between the more and less successful 12–14 years old judokas. Arch Budo 6: 95–100. Drid P, Trivić T, Tabakov S (2012). Special judo fitness test-a review. Serbian Journal of Sports Sciences, 6(4), 117-125. Drid P, Casals C, Mekic A, Radjo I, Stojanovic M, Ostojic SM (2015). Fitness and anthropometric profiles of international vs. National judo medallists in half-heavyweight category. Journal of Strength and Conditioning Research, 29(8), 2115-2121. Franchini E, Vecchio FB, Matsushigue KA, Guilherme AG (2011). Physiological profiles of elite judo athletes. Sports Med, 41(2), 147-166.

EQUAL VOLUME ISOTONIC AND ISOKINETIC KNEE EXTENSORS STRENGTH TRAINING EFFECTS.

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Introduction: The purpose of this study is to compare the effects of equal volume isotonic and isokinetic training on muscle strength measured by an isokinetic dynamometer in physically active healthy men. Methods:150 students from the Faculty of Sports and Physical Education (aged 19.6 ± 1.38 years; height 184 ± 8.9 cm; weight 88.3 ± 8.9 kg) were randomly divided into 3 equal groups. During an eight-week experimental procedure, all three groups performed physical activities related to the curriculum, but experimental groups 1 and 2 had additional isotonic (EX 1) and isokinetic (EX 2) knee extensors training. Overall training volume was expressed by the number of sets (3) and repetitions (5-15). Changes between the initial and final measurements in each group were analyzed using paired samples T-test. The statistical significance of the difference between the effects size was determined using univariate analysis of variance with post-hoc test. Results: Statistically significant difference occurred in both experimental groups. The results indicate that both the isotonic and isokinetic training resulted in statistically significant larger effects when compared to the control group, and that the experimental groups differ from one another only in non-dominant leg extension. 8-week isokinetic strength training results in larger strength gains than equal volume isotonic training in healthy physically active male population. Discussion: Although all the effects are larger, if quantified, in isokinetic group, only one variable was statistically significant. These two contraction types stimulate muscles in different ways (Guilhem et al., 2010) and, additionally, they result in different neuromuscular adaptation and in different torque-angle and torque-velocity changes (Remaud et al., 2010). The isokinetic training progressively adapts to allow maximal force generation (Gerdle & Fugl Meyer, 1992). These changes could be also due to training specificity (Sale & MacDougall, 1981). It is possible that the isokinetic group had bigger gains than the isotonic group because of the testing procedure. Additionally, based on earlier studies (Munn 2005), is that, in the initial stages of training, greater load is superior and causes greater gains, even in the acute phase of the training. We can encourage practitioners, both strength and conditioning coaches and clinicians, to utilize isokinetic dynamometry in early phase of strength training for greater strength gains. References: Guilhem G, Cornu C, Guével A (2010). Ann Phys Rehabil Med, 53(5), 319-41. Remaud A, Cornu C, Guével A (2010). Eur J Appl Physiol 108(1), 59-69. Gerdle B, Fugl-Meyer A (1992). Acta Physiol Scand, 145(2), 129-38. Sale D, MacDougall D (1981). Can J Appl Sport Sci, 6(2), 87-92. Munn J, Herbert RD, Hancock MJ, Gandevia SC (2005). Med Sci Sports Exerc, 37(9), 1622-6.

A ONE YEAR MONITORING STUDY ON DIFFERENCES IN SPRINT AND EXPLOSIVE POWER ON YOUTH SOCCER PLAYERS.

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Introduction: Elite soccer players spend approximately 11% of the game on sprinting (Bangsbo et al., 2006), which equates to a 10- to 15-m sprint every 90 seconds (Withers et al., 1982). This indicated that the sprint motor abilities is very important in the game of soccer especially in those team that want to

achieve higher results. The aim of this study was to find out it there was any differences in the performance of youth soccer players in one year on sprint and explosive power of lower limbs. Methods: In this study took part 35 youth soccer players aged 15.2 ± 0.21 years (first measurement- M1) and 33 soccer players (second measurement- M2) during one year. They performed sprint test (30m sprint and 50m sprint), and explosive power (standing broad jump test). Results: Data on sprint (30 m) for the players show performance with: M1= 4.27 seconds while M2= 4.5 seconds (F= 6.081 and p= 0.016) while for sprint (50 m): M1= 6.62 seconds while M2= 6.93 seconds (F= 30.373 and p= 0.000). Results on standing long jump showed: M1= 225.4 cm while M2= 208.7 (F= 30.421 and p= 0.000). Discussion: This results revealed significant decreases in the performance of youth soccer players in one year. Also the performance on explosive power on standing long jump tests decreases (statistical significance). Coaches that work on training sessions with youth has to more conscious on planning this sessions and be carefully on working with different techniques on the performance of motor abilities. References: Bangsbo, J, Mohr, M, and Krustrup, P. (2006). Physical and metabolic demands of training and match-play in the elite football player. J Sports Sci 24: 665–674. Withers, RT, Maricic, Z, Wasilewski, S, and Kelly, L. (1982). Match analysis of Australian professional soccer players. J Hum Move Stud 8: 159–176.

FREQUENCY OF FOOT DEFORMITY STUDENTS OF THE FACULTY OF SPORT AND PHYSICAL EDUCATION.

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Introduction: The main objective of this study was to determine possible foot deformities students of the Faculty of Sport and Physical Education. It is known that the condition of active and passive elements biomotoric appliance depends on the function of the foot, so as the biggest problem is insufficient tone ligament apparatus and the muscles of the foot. Instep are under the influence of body weight, which may be another reason for the higher incidence of flat feet in obese individuals (Wozniacki et al., 2013). Obesity is one of the main causes of flat feet, which is directly associated with reduced physical activity (Khalid, Rai, Mobeen & Amjad, 2015). Methods: The research was conducted at the Faculty of Sport and Physical Education in Niksic, on a sample of 116 respondents. The sample of variables consisted of a total of two foot deformities: flat feet (pes planus) and carved feet (pes cavus) divided into three levels according to the severity of the deformity, from the lightest to the heaviest, including foot without deformity. For determining the status of the foot, was applied orthopaedy on the basis of which is considered plantar side of the foot. It was used appliance brand PODOSKOPIO LUX 02990. Results: The results are presented in tables in the percentage and numerical representation of the assessment deformities flat and hollowed foot. According to the results it is evident that out of 116 respondents, 53 students (45.7%) were without deformities. Numerical and percentage estimates flatfoot deformity is: 16 students (13.8%) - level I; 6 students (5.2%) - level II; Numerical and percentage estimates hollowed foot deformity is: 28 students (24.1%) - level I; 7 students (6 %) – level II; 6 students (5.2%) - level III. Discussion: Based on the obtained data we can see that there are still certain degree of deformity, although for the respondents who participated in individual sports. The highest percentage shows deformity “hollowed foot” of the first degree (24.1%), which is often the case with people athletic type. Some studies have shown that people with recessed feet in some sports disciplines, achieve the same results as people with normal feet (Jovovic, 2008). Accordingly, foot deformity may occur not only in the period of growth and development, but also in later years

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THE ASSOCIATION OF SPRINT PERFORMANCE WITH ANTHROPOMETRIC PARAMETERS IN YOUTH SOCCER PLAYERS.

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Introduction: Several studies have investigated the association between strength and sprint performances, showing that stronger athletes perform better during sprint performances (Baker and Nance 1999; Comform et al., 2012). Moreover, the aim of this study was to evaluate the correlation between sprint performance and anthropometric parameters. Methods: Subjects were 32 youth soccer players. The age of participants was 15.1 ± 0.3 years. Sprint time (50m sprint) was evaluated during sprint test, and anthropometric parameters were measured (weight, height, percent body fat). Correlation analysis (Pearson test) was performed to evaluate the correlation between sprint and anthropometrics. Results: Results showed correlation between weight and sprint (r=-0.041 Sig= 0.834); BMI values and sprint (r=0.231 Sig= 0.236), height and sprint (r=-0.384 Sig= 0.044); percent body fat and sprint (r=0.440 Sig= 0.019). Discussion: In conclusion, the results of this study show no significance association between weight and BMI with sprint performance and significance correlation between height (negative correlation) and percent body fat (positive correlation) with sprint. References: Baker, D and Nance, S. (1999(. The relationship between running speed and measures of strength and power in professional rugby league players. J Strength Cond Res 13: 230–235. Comfort, P, Bullock, N, and Pearson, SJ. (2012). A comparison of maximal squat strength and 5-, 10-, and 20-meter sprint times, in athletes and recreationally trained men. J Strength Cond Res 26: 937–940,

RELATIONS BETWEEN ANTHROPOMETRIC CHARACTERISTICS AND MOTOR ABILITIES OF 14 – 15Y FEMALE SWIMMERS ON 50m RESULT FOR EACH TECHNIQUE.

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Introduction: For good swimming result it is important to know to swim all four techniques. Next to that it is important to know which elements, except swimming technique, effects on swimming result in all four swimming techniques. Good swimming result depends of morphological characteristics, motor and functional abilities (Volčanšek, 2002). Also anthropometric characteristics are important for successful swimming (Zaciorsky and Safarjan, 1972; Schramm, 1987; Wilke, 1992). Methods: In aim of correlation between anthropometric characteristics, motor abilities and results of swimming 50m in all swimming techniques, a group of 22 swimmers (girls) of Serbian national team, aged 14-15y, underwent some anthropometric measurements as well as some motor abilities. Observed longitudinal dimensions were: body height, body mass, arm span and chest circumference and observed motor abilities were:

body strength (arms, legs, stomach) and flexibility (trunk and arms). Regression analyses were used in this research. Results: Regression analyses showed that arm span correlated with 50m butterfly and free style score as well as strength of body and legs correlated with 50m backstroke and free style score. Other measures didn't correlated significantly on this sample. Discussion: Study results confirms importance of arm span and some segments of body strength of female swimmers for successful swimm on 50m in butterfly, backstroke and freestyle techniques in the age 14-15 years. (Richards, R. 1999) quotes that top swimmer have big arm span. Bigger arm span the longer strokes, so swimmer can swim 50m with small number of strokes, which could effect on small energy consumption. It is important to teach female swimmers to have the best possible technique as well as strong body. References: Richards, R. (1999). Talent identification and development. ASCTA ConventionZaciorsky, V. M.; Safarjan, J. G. (1972): Untersuchung von Faktoren zur Bestimmung der maximalen Geschwindigkeit im Freistilschwimmen. Theorie und Praxis der Körperkultur, 21, 695-709. Volčanšek, B. (2002). Bit plivanja, Kineziološki fakultet, Zagreb.

THE RELATIONSHIPS BETWEEN HAND PREFERENCE AND GENDER AMONG ELITE SWIMMERS.

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Introduction: Lateralization of the hands, feet, and organs such as ears, one on the right or left side of the body is called to the use of preference or priority (Leong 1980). Hand dominance refers to specific processes used in making the preferred. Both handedness and left-handedness is supported by some environmental reasons, especially basketball and handball players, the ones that did boxing and wrestling, a sculptor, a surgeon who steal musical instruments and patients, this type of domination, it is believed that this provides significant advantages. The purpose of this study is to examine the relationship between hand preference in the gender of elite swimmers. Methods: Research in the age range 14-18 n=66 volunteers participated in elite swimmers. Swimmers 27% female(40.9), 39% male (%59.1). When determining the choice of hand "Oldfield Survey" was used. The results evaluating depend on "Geschwind score" (Tan, Ü.1988). The distribution of hand preference were grouped into 5 groups. "Levene's homogeneity test", "Kolmogorov-Smirnov normal distribution fit test" and "Mann - Whitney U test" was used for data analysis. Results: Swimmers participating in the survey average, respectively; age 15.82 ± 1.09 years, lengt 171.39 ± 9.20 cm and body mass index 64.07 ± 10.23 kg. Elite swimmers found that 48% of weak right-handed, 15% strongly right-handed, 3 weak-handed, left 2, strong left-handed. Found that hand preference did not change according to gender ($p>0.05$). Female and male swimmers of both sexes was significantly higher rate in the rate preference right handedness the other ($p<0.5$). Discussion: The absence of a relationship between hand preference and gender in swimmers swimmer's of both genders at a high level of your right hand, preferably are used. According to the findings, the right hand hemisphere of the brain hemisphere left brain dominant in elite swimmers, preferring to suggest that it may be. Common accepted view on the studies, right-hand dominant 99% of the population that is revealed through the language of the functions of the left cerebral hemisphere. The left hand dominant ones, the cross-the relationship has become corrupted to a large extent, but still the priority of the left hemisphere, at least 70% stated that it is continuing at a rate of. Ambidexterity (being both-handed) and using left hand are supported by some environmental reasons and such dominance is seen especially among the people playing sport, people wrestling and boxing, sculptors, surgeons

and people are playing an instrument. For this reason, in elite swimmers during training activities to be held with two hands, left hand and both recommended that it be given. References: Leong, CK. (1980). Reading Research Quarterly, 15(2), 185-202. Tan, Ü. (1988). J. Nevroscience, 42, 85-105.

THE ANTHROPOMETRIC STATUS OF ELITE FEMALE SOCCER PLAYERS.

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Introduction: The main aim of the current study was to determine anthropometric status of elite female soccer players. Methods: The sample consisted of 25 members of Montenegrin women's soccer national team. The players were tested at the beginning of the 2012/13 competition season. For the purpose of this research, 12 anthropometric measures were taken: body mass, body height, leg length, arm length, biacromial diameter, biiliac diameter, elbow diameter, knee diameter, upper arm girth, forearm girth, thigh girth, calf girth. All measurements were performed folowing the instructions of the International Biological Programme. Results: Morphological profile of Montenegrin soccer players identified in this paper is at a similar level with players' profiles in previous research, with an important characteristic relating to body height across the sample and longitudinal measures of upper and lower extremities of goal keepers. Discussion: Women's soccer in Montenegro is very young. This was one of the main reasons for the author to determine anthropometric status of Montenegrin female soccer players. The results of this research relating to morphological characteristics of players show a significant degree of similarity of this with previous scientific studies. Summing up all, a conclusion may be drawn that Montenegrin female soccer players have quite similar, maybe even identical morphological status as other female soccer players on the European continent. The results and the findings of this scientific study are also of outmost importance in defining morphological status off elite female soccer players, in order to enable efficient telent identification, selection as well as for developing optimal training procedures. However, further research should be performed in order to establish age related changes in the anthropometric status of elite female soccer player. References: Davis JA, Brewer J (1992). Sport Med, 16(3), 180-189. Garcia J, Quintana-Domeque C (2007). Econ Human Biol, 5(2), 340-349. Idrizovic K, (2014). Med sport, 67(2), 273-287. Idrizović K, (2014). Kond trening, 12(1), 56-67. Mujika I, Santisteban J, Impellizzeri F, Castagna C (2009). J Sport Sci, 27, 107-114. Pineau JC, Delamarche P, Bozinovic S (2005). C R Biol, 328(9), 841-846. Vecovi JD, Rupf R, Brown TD, Marques MC (2011). Scand J Med Sci Sport, 21(5), 670-678. Vucetic V, Sporis G, Jukic I (2007). J Sport Sci Med, 6(Suppl. 10), 109-110.

ASSESSMENT AND DIFFERENCES IN ANAEROBIC CAPACITY OF FOOTBALL PLAYERS PLAYING ON DIFFERENT POSITIONS IN THE TEAM, USING RAST TEST.

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Introduction: The main objective of this study is to determine the importance of anaerobic capacity of football players in terms of a specific playing position in the team. In addition, a separate analysis of maximum strength, minimum strength, mean strength and fatigue index was performed in order to determine whether particular positions feature a dominant ability to maintain anaerobic performance

during the match, the time duration of strength loss or there is only the possibility of expressing the maximum strength but without the possibility of repetition in high pace. Methods: We applied the experimental method of transversal character. The sample of respondents included sixty players of the cadet age (14-16 yr.), divided by playing position. In order to determine the anaerobic capacity "The Running-based Anaerobic Sprint Test" (RAST) was applied, in order to provide information on anaerobic strength and stress, and enables measurement of strength and fatigue index (Mackenzie, 2005; Cedric, Marc & Thierry, 2007; Sayers A., Sayers B. & Binkley, 2008; Cipryan & Gajda, 2011). Multivariate MANOVA methods and discriminant analysis will be applied. Regarding univariate methods ANOVA t-test and Roy's test will be applied. Results: High values of coefficient of variation indicate significant differences, or pronounced heterogeneity in all variables and groups. Significance obtained by multivariate analysis of variance (p=.100) is at the level of significance threshold. Discriminant analysis, as more sensitive method, shows the absence of differences (p=.204), as confirmed by the values from the univariate analysis of variance, i.e. no difference was observed between the groups regarding the observed variables. Discussion: Although no significant statistical difference was observed, the results of this study tell us that the highest average values of maximum strength were achieved by goalkeepers. The dominant activities of the goalkeeper during the match are explosive starts, jumping, rushing to ten meters, but with great time pauses between two repetitions. Also, the research results show us that goalkeepers have the highest index of fatigue, or poorer ability to repeat sprints within the particular period of time. Forward players have the highest value of the average power. References: Cedric, L., Marc, G. V. & Thierry, B. (2007). Anaerobic power of junior elite soccer players: A new performance. Physiological testing of football players-poster presentations. Journals of Sports Science and Medicine, 10, 115. Cipryan, L. & Gajda, V. (2011). The Influence of Aerobic Power on Repeated Anaerobic Exercise in Junior Soccer Players. Journal of Human Kinetics, Vol. 28, 63-71. Mackenzie, B. (2005). 101 Performance Evaluation Tests. London: Electric Word plc. Sayers, A., Sayers, B., Binkley, H. (2008). Preseason Fitness testing in national Collegiate Athletic Association Soccer. Strength and Conditioning Journal, Vol.30, No.2.

Workshops

Workshop 1

MEASURING MOTOR ASYMMETRY IN SPORTS

Approximately 90% of the population is right-handed (Caliskan & Dane, 2009; Jung & Jung, 2009; Perelle & Ehrman, 1994; Vuoksimaa, Koskenvuo, Rose & Kaprio, 2009) and prefer to use the dominant hand for dynamic activities such as throwing or cutting. Most activities of daily living, including brushing one's teeth, combing one's hair, or flipping a light switch, can be performed automatically without conscious effort. When such activities only require a single hand, one may choose either non-dominant or dominant hand, depending on task requirements. Some tasks that require two hands, like peeling a banana or cutting bread, distribute different task requirements between the hands. We often perform holding task with the non-dominant hand, and the movement task with the dominant hand. Even though we often view hand dominance, or "handedness" as reflecting different proficiencies of our two arms, handedness is commonly assessed by questionnaires about preferences, rather than by measuring differences in performance.

In a very basic concept, we can define the motor asymmetry as the performance differences between the dominant and the non-dominant sides of the body. This motor asymmetry differences can be seen both in handedness and footedness. In many sports, it is very advantageous to use both side of the body. With the help of advanced technology, it is nowadays easy to measure the performance differences of both sides of the body. Sainburg (2006, 2012, 2014) developed a virtual reality system, kinereach, which can be used to measure motor asymmetry differences especially for the arms. This system enables participants to play like a computer game and during that time measure the arm movements in many aspects, like speed, accuracy, linearity, acceleration, deceleration etc.

In this workshop, we will show a similar setup like Sainburg's system. By this way, we can measure both arm and foot movements and get valuable data to compare dominant and non-dominant sides. This is especially very important to understand if motor asymmetry is different among sports. Moreover, this would be a good assessment way to see the effect of the training and improvement of the athletes.

Assist. Prof. Dr. Selçuk Akpinar is currently employed at Nevsehir Haci Bektas Veli University, Turkey. 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-hoc for 6 months later on. He tries to investigate the effect of long-term training in different types of sports on motor lateralization.

Workshop 2

TESTING BODY (A)SYMMETRIES AND ITS PRACTICAL APPLICATIONS

Evidence based physical conditioning and sports injuries prevention/rehabilitation has gained recognition and keeps rising attention of practitioners and researchers. Inter-muscular strength/power relationships and postural balance represent an important aspect of such an approach. The presentation will summarize the most important approaches to testing body (a)symmetries and muscle (im)balances such as: (1) agonist-to-antagonist ratio, (2) contra-lateral strength differences, (3) inter-limb differences when performing bilateral motor tasks, (4) limb weight-bearing differences during standardized postural tasks. Real measurement procedures will be demonstrated using a dynamometer(s) and a bi-lateral force plate, both being a result of our own research and development for the global market (S2P, Science to Practice, d.o.o.).

Dr. Nejc Sarabon is an associate professor at the University of Primorska, Andrej Marusic Institute, Department of Health Study, Koper, Slovenia; and S2P d.o.o., Laboratory for Motor Control and Motor Behaviour, Ljubljana, Slovenia. His background is in physical therapy and sport science which he upgraded with the (post)doctoral projects on the fields of motor control and motor behaviour. His primary research interests include balance, sensory-motor integration processes, kinaesthesia, and inter-muscular coordination – all in the context of performance optimization and injury prevention. He is also very active in the domain of methodological and technical innovations. He has been most intensively involved in research and development related to biomechanical and electrophysiological approaches, specifically applied to functional stability, postural balance and more generally alterations of sensory-motor integration processing during different acute and chronic injuries/interventions. For several years Dr. Nejc Sarabon is a science-to-practice consultant for strength training, conditioning, prevention and rehabilitation at different National Teams. He is a founder and owner of two successful spin-off companies (S2P, Science to Practice, d.o.o. and Cycling Science d.o.o.).

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MARITIME FACULTY - KOTOR

In addition to maritime education in navigation and marine engineering, University of Montenegro - Maritime Faculty in Kotor also provides additional training for professional seafarers in:

- Different IMO model courses
- DP - Dynamic positioning courses
- Offshore courses

From 2015 runs the newly established joint training center with partners from NTNU - Aallesund in Norway, being one of the most experienced and most successful in providing offshore and DP training courses worldwide. The up-to-date bridge simulator, accompanied by AB simulations and instructor station, enables the organization of all the courses held as in the Norwegian training centers, with the same team of instructors and certificates. So far, a series of courses have been organized related to the operation of complex offshore equipment and team work in these demanding operations, both for students and international crews. In addition, the Kotor/Aalesund training center has recently been awarded with the Nautical Institute accreditation for holding DP (Induction and Simulator) trainings and so far has successfully launched several groups of DP operators.

OSC offshore simulator at Maritime Faculty Kotor, Montenegro

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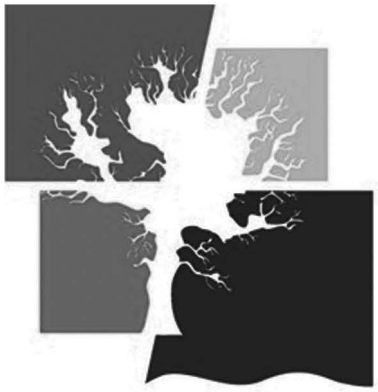

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