

**Youth Sport**

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**8th Conference for Youth Sport**

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The conference is hosted by the University of Ljubljana, Faculty of Sport, Slovenia

### **Scientific Committee**

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## SCIENTIFIC PROGRAMME

### KEYNOTE SPEECHES

**Friday, 9 December 10:30 - 11:30**

YOUTH, SPORT AND SOCIETY: SOME CRITICAL REMARKS

*Prof. Dr. Benjamin Perasović, Institute of Social Sciences Ivo Pilar, Croatia*

**Saturday, 10 December 9:00 - 10:00**

"I WISH I WAS A BALLER, BUT WHAT ABOUT A SCHOLAR-BALLER? CULTURAL IDENTITIES IN YOUTH SPORT ACROSS URBAN, SUBURBAN, AND RURAL COMMUNITIES WORLDWIDE (THEORY AND PRACTICE)"

*Prof. Dr. Keith Harrison, University of Central Florida, USA*

**Saturday, 10 December 14:30 - 15:30**

VARIABILITY OF PRACTICE AS AN INTERFACE BETWEEN MOTOR AND COGNITIVE DEVELOPMENT PROMOTION: IMPLICATIONS FOR YOUTH SPORT

*Prof. dr. Caterina Pesce, University of Rome Foro Italico, Italy*

### PARALLEL SESSIONS

**Session 1 Friday, 9 December 11:45 - 13:00**  
Challenges in the field of physical education

**Session 2 Friday, 9 December 11:45 - 13:00**  
Performance and match analysis

**Session 3 Friday, 9 December 14:00 - 15:00**  
Training and testing

**Session 4 Friday, 9 December 14:00 - 15:00**  
Posters

**Session 5 Friday, 9 December 15:00 - 16:15**  
Sports career dilemmas

<b>Session 6</b>	<b>Friday, 9 December</b> Children at high altitude	<b>15:00 - 16:15</b>
<b>Session 7</b>	<b>Friday, 9 December</b> Youth Development	<b>16:30 - 17:45</b>
<b>Session 8</b>	<b>Saturday, 10 December</b> Posters	<b>8:30 - 9:00</b>
<b>Session 9</b>	<b>Saturday, 10 December</b> Youth development	<b>10:00 - 11:30</b>
<b>Session 10</b>	<b>Saturday, 10 December</b> Principles for sports training in youth sports	<b>10:00 - 11:30</b>
<b>Session 11</b>	<b>Saturday, 10 December</b> Principles for sports training in sports	<b>11:45 - 13:00</b>
<b>Session 12</b>	<b>Saturday, 10 December</b> Training and testing	<b>11:45 - 13:00</b>
<b>Session 13</b>	<b>Saturday, 10 December</b> Talent identification	<b>15:30 - 16:45</b>
<b>Session 14</b>	<b>Saturday, 10 December</b> Principles for sports training in swimming	<b>15:30 - 16:45</b>
<b>Session 15</b>	<b>Saturday, 10 December</b> Sports in High School and College	<b>17:00 - 18:00</b>
<b>Session 16</b>	<b>Saturday, 10 December</b> Psychological aspects in youth sport	<b>17:00 - 18:00</b>

## SCHEDULE OF PARALLEL SESSIONS

**Session 1 Friday, 9 December 11:45 - 13:00**

### **1 Challenges in the field of physical education**

Chair: Mokrousov E.

Ceciliani, A., Semprini, G., Di Michele, R., Toselli, S., Merni, F.	EXTENSIVE AND INTENSIVE MULTILATERAL ACTIVITIES AS NECESSARY INTEGRATION IN PHYSICAL EDUCATION IN PRIMARY SCHOOL: AN EXAMPLE IN KINESTHETIC DIFFERENTIATION ABILITY
Johansson, L., Ruud, E.	THE EFFECTS OF PHYSICAL ACTIVITY ON HEALTH AND LEARNING OUTCOMES AMONG SECONDARY SCHOOL PUPILS
Semprini, G., Ceciliani, A., Di Michele, R., Toselli, S., Merni F.	EFFECTS OF TRADITIONAL AND HIGHLY EMOTIONAL PHYSICAL EDUCATION PROGRAM IN HIGH-SCHOOL STUDENTS
Mokrousov, E.	TABLE TENNIS AS THE THIRD LESSON IN THE SYSTEM OF PHYSICAL EDUCATION IN PRIMARY SCHOOL CHILDREN

**Session 2 Friday, 9 December 11:45 - 13:00**

### **2 Performance and match analysis**

Chair: Sattler T.

Daniels, J.	CAPTURING THE REALITIES OF SPORTS PROGRAMMES: SYSTEMATIC 'MESSINESS'?
Pori, P., Jarc Šifrar, T., Dolenc, M., Pistotnik B.	ANALYSIS OF ENERGY EXPENDITURE DURING EXERCISES WITH FREESTLYER™ ELASTIC TUBES OF DIFFERENT RESISTANCE
Tenga, A.	A COMPARATIVE ANALYSIS OF THE EFFECTS OF DIFFERENT DEFENSIVE ORGANISATIONS ON TEAMS' MOVEMENT INTENSITY AND DEFENSIVE PERFORMANCE DURING SOCCER MATCHES IN WC 2014
João, P.V., Sampaio, J., Mesquita, I., Sattler, T.	ANALYSIS OF THE VOLLEYBALL SKILLS ON YOUTH WORLD CHAMPIONSHIP FOR MALE AND FEMALE
Harbili, S., Harbili, E., Tunçel, A.	EVALUATION OF MOTOR ABILITIES IN PROFESSIONAL SOCCER PLAYERS
Tessitore, A., Condello, G., Conte D., Raschiatore, V., Capranica, L., Tschan, H.	ANALYSIS OF MOVEMENTS PERFORMED DURING YOUTH TENNIS GAMES

**Session 3 Friday, 9 December****14:00 - 15:00****3 Training and testing**

Chair: Tessitore A.

Nigro, F., Bartolomei, S., Merni, F.	VALIDITY OF DIFFERENT SYSTEMS FOR TIME MEASUREMENT IN 30M-SPRINT TEST.
Pečnikar Oblak, V., Karpljuk, D., Šimenko, J.	IMPROVING GRIP STRENGTH OF G-JUDOKAS
Okrožnik, K., Strojnik, V, Dolenc, A.	COMPARISON OF TAKE-OFF ACTION BETWEEN 3-STEP APPROACH AND 7-STEP APPROACH
Smajla, D., Štirn, I., Strojnik, V.	DIFFERENCES IN MUSCLE ACTIVATION BETWEEN PUNCHES WITH AND WITHOUT IMPACT ON THE TARGET
Tessitore A., Ballini C., Tschan H., Condello G., Gjaka M., Figueiredo A.J.	HOW FAST YOUNG SOCCER PLAYERS ARE ABLE TO RUN IN A MATCH CONDITION, COMPARED TO HOW FAST THEY ARE IN A MAXIMAL FIELD TEST?

**Session 4 Friday, 9 December****14:00 - 15:00****4 Posters**

Gardasevic, J., Popovic, S., Bjelica D.	AFTER PREPARATION PERIOD BALL SHOOTING ACCURACY AT PLAYERS U15
Videmšek, M., Karpljuk, K., Štihec, J., Hadžić, V., Videmšek, N., Gregorc, J., Meško, M.	CHILDREN AND ADOLESCENT INJURIES DURING PHYSICAL ACTIVITIES
Rezende, M., Toscano, C., Cabral Júnior, C., Ferreira, J. P.	EFFECTS OF PHYSICAL ACTIVITY ON SLEEP QUALITY IN CHILDREN WITH AUTISM
Cizl, P., Kajtna T.	PARENT'S REACTIONS ON FOOTBALL MATCHES
Dežman, B., Kajtna, T.	PARENT'S MOTIVES FOR INCLUDING CHILDREN IN NON-COMPETITIVE SPORT
Dacerová, V., Burešová, I.	THE SPORTS RITUALS
Burešová, I., Demlová, T.	COPING STRATEGIES PREFERRED BY ADOLESCENTS WHEN MANAGING STRESS IN SPORT



**Session 5 Friday, 9 December****15:00 - 16:15****5 Sports career dilemmas**

Chair: Doupona Topič M.

Bon, M.	COPING WITH RETIREMENT FROM AN ACTIVE SPORT CAREER - THE CASE OF SLOVENIAN HANDBALL PLAYERS
Kerštajn, R.	SPORTS CAREER AND EDUCATION SPORTS CAREER AND EDUCATION OF TOP NORDIC ATHLETES: COMPARISON BETWEEN THE SLOVENIAN, ITALIAN AND NORWEGIAN ATHLETES
Bartoluci, S., Doupona Topič, M.	YOUNG ATHLETE AND CHALLENGES OF NATIONAL IDENTITY: THE CASE OF JAKOV FAK
Šetinc, A., Doupona Topič, M.	DIFFERENCES IN THE DUAL CAREER PATHS OF STUDENTS ATHLETES IN SLOVENIA, CROATIA AND SERBIA

**Session 6 Friday, 9 December****15:00 - 16:15****6 Children at high altitude**

Chair: Kapus J.

Kapus, J., Mekjavić, I. B., Mcdonnell, A. C., Ušaj, A., Vodičar, J., Najdenov, P., Jakovljević, M., Jaki Mekjavic, P., Žvan, M., Debevec T.	SIMILAR CARDIORESPIRATORY EFFECTS OF HYPOXIA DURING CYCLING AND SIMULATED SKIING IN ADULTS AND CHILDREN
Usaj, A., Mekjavic, I.B., Mcdonnell, A.C., Kapus, J., Vodičar, J., Najdenov, P., Jakovljevic, M., Jaki Mekjavic, P., Žvan, M., Debevec, T.	MUSCLE OXYGENATION AND CARDIORESPIRATORY RESPONSES DURING INCREMENTAL EXERCISE IN CHILDREN AND ADULTS

**7 Youth Development**

Chair: Daniels J.

Milić, R., Dopsaj, M., Šimenko J., Rauter, S., Mohorič, U., Čoh, M.	PROTEIN FAT INDEX AT ADOLESCENT MALE ATHLETES: QUANTITATIVE CHARACTERISTICS OF NOVEL BODY COMPOSITION INDEX
Bianco, A., Messina, G., Martines, F., Sahin, N., Bellafiore, M., Battaglia, G., Zangla, D., Paoli, A., Iovane, A., Palma, A.	IS BODYWEIGHT AFFECTING POSTUROGRAPHY IN CHILDREN AGED BETWEEN 9 AND 11 YEARS? EVIDENCES OF A PILOT INTERVENTION.
Daniels, J.	YOUTH DEVELOPMENT THROUGH SPORT: A CASE STUDY OF A DISABILITY GYMNASTICS PROGRAMME
Fister, K., Fister, I.Jr.	THE EFFECT OF ENDURANCE SPORTS ON MATERNAL FERTILITY AND FETAL DEVELOPMENT

**Session 8****Saturday, 10 December 8:30 - 9:00****8 Posters**

Gumusgul, O., Acet, M., Isik, U.	LEISURE CONSTRAINTS: A COMPARISON OF UNIVERSITY STUDENTS FROM PHYSICAL EDUCATION AND SPORTS AND OTHER DEPARTMENTS
Gunduz, B., Senturk, A.	THE COMPARE OF SOME PHYSIOLOGICAL FEATURES SOCCER PLAYERS ACCORDING TO THE POSITIONS
Genc, H.I., Harmandar Demirel, D., Yaman, C.	EXERCISE AND CHILDREN'S PLAY AREAS WHICH ARE NECESSARY FOR MUNICIPAL ADMINISTRATIONS, AND EXPECTATIONS OF SOCIETY FROM THESE PLACES (THE EXAMPLE OF ADAPAZARI)
Serdar, E., Donuk, B., Aydin, I.	STUDY ON THE REASONS WHY COLLEGE STUDENTS DO NOT ATTEND THE LEISURE TIME ACTIVITIES
Öner, E., Demirel, M.	THE COMPARISON OF NATIONAL TENNIS PLAYERS AND MIDDLE EAST TECHNICAL UNIVERSITY TENNIS PLAYERS' ANXIETY LEVELS BEFORE THE COMPETITION
Güven, G., Yüksel, Y.	EFFECTS OF AGE ON AEROBIC POWER IN SOCCER PLAYERS
Osorio-Gutierrez, A., Valente-Dos-Santos, J., Duarte, J., Costa, D., Seabra, A., Castanheira, Coelho-E-Silva, M.J.	SKELETAL MATURITY AND AGE VERIFICATION IN YOUTH FEMALE SOCCER PLAYERS.

**Session 9****Saturday, 10 December 10:00 - 11:30****9 Youth development**

Chair: Rauter S.

Kapo, S., Rađo, I., Čović, N., Husnija, Ivor, D.	RELATIONS BETWEEN BODY COMPOSITION AND SKELETAL DEFORMITIES OF YOUNG KIDS.
Macura, D., Toni, M.	PROBLEM OF PREMATURE COMPETITIVE ORIENTATION
Tešanović, G., Jakovljević, V., Stanković, V., Bošnjak, G.	EXERCISES PROGRAM OF KID'S ATHLETICS AS A MEANS OF IMPROVEMENT OF MOTOR ABILITIES
Šimenko, J., Rauter, S., Milić, R., Čoh, M., Vodičar, J.	CORRELATION OF MORPHOLOGICAL COMPONENTS WITH SOME MOTOR ABILITIES OF HIGH SCHOOL YOUTH
Gomis-Gomis M.J., Pérez-Turpin J.A.	RELATIONSHIP BETWEEN BODY SCHEME ACQUISITION AND DEVELOPMENT OF DRAWING IN EARLY CHILDHOOD EDUCATION: A CASE STUDY
Fister, I. Jr., Fister, K., Fister, D., Fister, I., Rauter, S.	THE IMPORTANCE OF MONITORING AND MAINTAINING DATA IN SPORTS TRAINING PROCESS

**Session 10****Saturday, 10 December 10:00 - 11:30****10 Principles for sports training in youth sports**

Chair: Štirn I.

Bavdek R., Zdolšek A., Dolenc A.	EMG COMPARISON OF TIBIAL MUSCLES DURING PLANTAR FLEXION AT EXTENDED AND FLEXED KNEE
Bjorkman, F., Eggers A., Stenman, A., Bohman T., Ekblom, O.	VALIDITY OF A SUBMAXIMAL CYCLE ERGOMETER TEST IN CHILDREN
Hartmann Nunes, R.F. Teixeira, A.S., Guglielmo, L.G.A.	THE INFLUENCE OF DIFFERENT AEROBIC MEASURES, SKELETAL MATURATION, BODY SIZE AND COMPOSITION ON REPEATED SPRINTS ABILITY (RSA) IN YOUTH SOCCER PLAYERS
Sašek, M., Štirn, I.	EFFECT OF ACTIVE REST BETWEEN SETS ON THE PLYOMETRIC TRAINING FOR FOOTBALL PLAYERS
Gabrovec, B.	ILLCIT DRUGS AND OTHERS SUBSTANCES USED BY YOUNG ATHLETES BETWEEN AGES OF 10 AND 25

**Session 11****11****Saturday, 10 December 11:45 - 13:00****11 Principles for sports training in sports**

Chair: Kajtna T.

Şükrü Serdar B., Zübeyde A.	SUBSTRAT OXIDATION RATES DURING EXERCISE IN TRAINED AND UNTRAINED YOUNG ADULTS
Zübeyde ,A., Şükrü, S.B.	THE EFFECTS OF 2-WEEK HIGH INTENSITY INTERVAL TRAINING ON FAT OXIDATION RATE DURING SUBMAXIMAL EXERCISE
Şahin M., Pepe H.	THE EFFECTS OF AEROBIC EXERCISE ON CORTISOL, INSULINE AND GLUCAGON HORMONE LEVELS OF ELITE ATHLETES
Zdolšek, A., Bavdek, A., Dolenc, A.	COMPARISON OF EVERTOR MUSCLE ACTIVITY BETWEEN FOOT EVERSION AND EXTERNAL ROTATION
Harbilij, E., Harbilij, S.	KINEMATICS OF THE SNATCH IN ELITE MALE WEIGHTLIFTERS

## Session 12 Saturday, 10 December 11:45 - 13:00

### 12 Training and testing

Chair: Capranica L.

Kambič, T., Sraka Vuković, R., Vuković, L., Šimenko, J.	IMPACT OF 1 YEAR JUDO PRACTICE ON BODY SYMMETRIES IN YOUTH JUDOKAS
Cerasola, D., Cataldo, A., Bianco, A., Capranica, L., Traina, M.	DRAG FACTOR ON ROWING ERGOMETER DURING 2000-M PERFORMANCE IN YOUNG ROWERS
Gubellini, L., Sfregola, A., Merni, F.	EFFECTS OF IN-SEASON STRENGTH TRAINING IN MALE AD FEMAL YOUTH VOLLEYBALL
Mostaert, M., Deconinck, F., Pion, J., Lenoir, M.	ANTHROPOMETRY, PHYSICAL FITNESS AND COORDINATION OF YOUNG FIGURE SKATERS OF DIFFERENT LEVELS

## Session 13 Saturday, 10 December 15:30 - 16:45

### 13 Talent identification

Chair: Tessitore A.

Rauter, S., Šimenko, J., Kreft, R., Čoh, M., Vodičar, J.	GUIDANCE OF TALENTED YOUTH INDIVIDUALS INTO ATHLETICS
Dopsaj, M., Babić, N., Čopić, N.	GENERIC MULTIDIMENSIONAL MODEL FOR RUNNING VELOCITY ASSESSMENT SCORE (RVAS): FOOTBALL TALENT SELECTION APPROACH
Li, P., Pion, J., De Bosscher, V.	IS JUNIOR SUCCESS A GOOD PREDICTOR OF SENIOR SUCCESS? A CASE STUDY OF COMBAT SPORTS.
Pion, J., Mostaert, M., Wazir, M.R., Lenoir, M.	ARE THE COACHES' NEEDS IN LINE WITH THE PERFORMANCE CHARACTERISTICS DIFFERENTIATING JUNIOR ELITE BASKETBALL, SOCCER AND VOLLEYBALL PLAYERS?
Koropanovski, N., Dopsaj, M., Mudrić, M.	HAND GRIP MUSCLE FORCE CHARACTERISTICS IN A FUNCTION OF YOUNG KARATE ATHLETE'S PHYSICAL FITNESS CONTROL AND SYSTEM OF PRE-SELECTION

## Session 14 Saturday, 10 December 15:30 - 16:45

### 14 Principles for sports training in swimming

Chair: Kajtna T.

Kapus, J., Moravec, T.	PRESCHOOL NON-SWIMMERS CAN SWIM BREASTSTROKE LONGER WITH THE SUBMERGED FACE THAN WITH THE HEAD ABOVE THE WATER
Moravec, T., Kapus, J.	THE EFFECT OF THE USE OF MASK AND SNORKEL DURING SWIM LEARNING PROGRAMME FOR PRESCHOOL NON-SWIMMERS
Koren, M., Kajtna T.	MOTIVATIONAL IMPACT OF INCLUSION IN SPORT OF PEOPLE WITH DISABILITIES IN THE CASE OF A SWIMMER
Rezende, M., Cipriano, S., Nunes A., Rosado, F., Massart, A., Rama, L.	HYDRATION LEVEL OF SWIMMERS DURING TRAINING SESSION A LOAD MICROCYCLE.
Stibilj, J., Kapus, J., Košmrlj, K.	EVALUATION OF MISTAKES AT THE SWIMMING TECHNIQUES

## Session 15 Saturday, 10 December 17:00 - 18:00

### 15 Sports in High School and College

Chair: Capranica L.

Ukic, M.	SOCIAL ASPECTS OF VIDEO EXERCISING DURING CLASS BREAKS
Papacharisis, V., Bouchouras, G., Dimou, K., Doganis, G.	ARISTOTLE UNIVERSITY OF THESSALONIKI SPORTS CENTRE: STUDENTS' SATISFACTION ABOUT ENROLLMENT IN SPORTS AND RECREATIONAL ACTIVITIES.
Sahin, F.N., Karabiyik, H., Aras, D., Kizilyalli, M., Yesil, F.	EFFECTS OF MASSAGE ON SELECTIVE PHYSICAL PARAMETERS ON COLLEGIATE ATHLETE

## Session 16 Saturday, 10 December 17:00 - 18:00

### 16 Psychological aspects in youth sport

Chair: Doupona Topič M.

Šuc, N., Lešnik, B.	ATHLETIC IDENTITY OF DISABLED SKIERS
Kajtna, T., Cvetković, B., Janko, V., Štrumbelj, B., Štihec, J., Luštrek, M.	EFFECTIVENESS OF A MOBILE APPLICATION WITH RESPECT TO ITS PERSONALIZATION AND USE OF MOTIVATIONAL ELEMENTS
Jovanović, S., Tešanović, G., Jakovljević, V.	RELATIONS BETWEEN PARTICIPATION IN RECREATIONAL ACTIVITIES WITH TIME AND PRACTICING HEALTH STATUS
Železnik, L., Kajtna, T.	INFLUENCE OF MOTIVATIONAL APPROACHES ON MOTORIC EFFECTIVENESS OF CHILDREN

## **SOCIAL CONFERENCE ACTIVITIES**

### **Welcome reception (Friday, 9 December, 20:00)**

The welcome reception will be at City hall. There we will be greeted by the Mayor of Ljubljana **Zoran Jankovič**.

The reception is offered by the Mayor of Ljubljana.

The dress code for the event is business casual attire.



Mestna občina  
Ljubljana

### **Slovenian Evening (Saturday, 10 December, 19:00)**

On the final day of the event we will take you to a culinary experience with some typical Slovenian dishes and drinks.

The dress code for the Slovenian evening dinner is business casual attire.

# **KEYNOTE SPEECHES**



### **YOUTH, SPORT AND SOCIETY: SOME CRITICAL REMARKS**

**Perasović, B.**

Institute of Social Sciences Ivo Pilar, Croatia

Modern sociological research on youth often emphasises the problem of the low level of youth participation in society. Youth participation in sports is viewed as one form of an active relationship towards society. Aside from the general issue of participation and the relationship of young people towards dominant social values, the question arises as to the form in which they are involved in sports. Careful examination shows a great divide between highly selective and competitive forms of training, the aim of which is to turn young people into top athletes from an early age, and recreational, spontaneous, amateur forms of sport as a less binding and less demanding form of training in the everyday life of young people. Both forms are legitimate, but the differences between them in some particular social contexts may be drastically sharpened as the result of broad social campaigns, such as the “sport against drugs” campaign in Croatia. The Croatian context allows insight into a process in which a significant number of young people, having become part of a dominant organisational form that is highly competitive and selective, end up suffering from serious heroin addiction in part as a result of not being able to continue playing sports (i.e. failing to graduate from juniors into seniors). Aside from examples in which society superficially promotes ‘preventive’ programmes, there are also examples in which society neglects prevention while promoting repression, as is the case with young people who form their identity through their passionate support of football clubs. We can also learn about the consequences of this approach through both the Croatian context and through recent research that breaks existing stereotypes concerning relationships between youth, sport, and society.

## Keynote Speeches

### **"I WISH I WAS A BALLER, BUT WHAT ABOUT A SCHOLAR-BALLER? CULTURAL IDENTITIES IN YOUTH SPORT ACROSS URBAN, SUBURBAN, AND RURAL COMMUNITIES WORLDWIDE (THEORY AND PRACTICE)"**

**Harrison H.**

University of Central Florida, USA

The purpose of this presentation is to unpack the external and internal dynamics that shape the identities of youth in sport worldwide. Specifically, the cultural forces that impact youth participants in sport and their achievement desires academically, athletically, socially, and occupationally will be the focus. Empirical data will be presented on contemporary trends of youth sport in the context of gender, race, and social class. Lastly, one of the most powerful labels currently in youth, young adult, and adulthood cultures--the baller, will be synthesized and analyzed. The baller label will be critiqued in terms of how the Scholar-Baller concept helps to create a balanced mindset that is competitive and self-affirming in all aspects of the student-athlete experience.

**VARIABILITY OF PRACTICE AS AN INTERFACE BETWEEN MOTOR AND COGNITIVE DEVELOPMENT PROMOTION: IMPLICATIONS FOR YOUTH SPORT**

**Pesce, C.**

University of Rome Foro Italico, Italy

The development of motor competence is central to youth sport training and predictive of positive developmental trajectories of health. Sport practice, however, does not only lead to skillful motor performance, but also to improvements in both domain-specific cognition useful for sport performance and domain-general, higher-level cognition—executive function—crucial for successful human development.

In this presentation, I highlight intriguing commonalities between the research areas of motor skill development/learning and exercise-cognition interaction. These two research domains have developed on separate tracks with different basic and applied research objectives, but the focus on variability of practice is central to both. I make the case that designed motor learning experiences in youth sport, centered on variability of practice, can promote brain plasticity and cognitive development. Novelty, diversity, effort, and successfulness seem essential characteristics to render learning experiences meaningful to this aim.

With a joint neuroscience and sport science approach, I bridge theory and practice, addressing how to capitalize on variability of practice as an interface between motor and cognitive development. I discuss how a balanced use of repetition and change can aid the development of executive functions and address the roundtrip between stability and flexibility to support key transitions in the development of cognitive control. I conclude by reframing variability of practice into emerging models of embodied cognition, which may unwrap a new venue for quality sports training.

## **ABSTRACTS**

**EXTENSIVE AND INTENSIVE MULTILATERAL ACTIVITIES AS NECESSARY INTEGRATION IN PHYSICAL EDUCATION IN PRIMARY SCHOOL: AN EXAMPLE IN KINESTHETIC DIFFERENTIATION ABILITY**

**Ceciliani, A.<sup>1</sup>, Semprini, G<sup>2</sup>., Di Michele, R.<sup>2</sup>, Toselli, S.<sup>2</sup>, Merni, F<sup>2</sup>.**

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Previous studies indicate that the kinesthetic differentiation ability is crucial in different sports (Pakosz, 2013), in motor control (Grzegorz, 2011), in sports performance (Bankosz, 2015) and requires a specific education (Ziemowit, 2012). The extreme diffusion of extensive multilateral approach in primary school, compared with children who are increasingly sedentary, doesn't seem enough to develop specific ability of motor coordination (balance, kinesthetic differentiation, rhythmic control, etc.). This study aimed to compare, in primary school children (mean age: 9 yrs), the effects of a multilateral extensive activity programme (MED), oriented to dexterity, and multilateral intensive activity programme (MIK), oriented to kinaesthetic differentiation. 77 boys (MED:39; MIK:38) and 76 girls (MED:38; MIK:38) were involved. In both groups, the activity consisted of one 2-hr sessions/week throughout the school year. The following test battery was administered: BrikTest differentiation (BTD), Generic throw at a fixed distance (GTF), Generic throw on increasing distances (CTI), Generic blindfolded throw (BTF), Basket Throw (SBT). The tests were administered in T1 (October), T2 (January) and T3 (May). There has been a significant enhancement in MIK Group both in T2 (GTF, CTI, BTF) that in in T3 (BTD, GTF, CTI, BTF SBT). BTD and SBT improved in T3 only in older children (grade 5), while SBT improved in T3 only in younger children (grade 3 and 4) but not in the oldest (grade 5). Gender differences occurred only in CTI. The ability to transfer generic throw (GTF, CTI) to specific throw (SBT) appears effective from the age of 10 years but not at previous ages. The study seems to suggest the idea that the MED if supplemented by MIK and enlarged to other abilities (balance, rhythm, etc), can be a good strategy to develop the motor skills of children nowadays as they have little time to exercise quantitative but also qualitative physical activity.

*Keywords: multilateral activities, Physical Education, children, primary school, motor skills*

**THE EFFECTS OF PHYSICAL ACTIVITY ON HEALTH AND LEARNING OUTCOMES AMONG SECONDARY SCHOOL PUPILS**

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This paper reports from a systematic review on the effects of physical activity on health and learning variables in secondary schools. Following established literature search procedures and quality assessment of the research literature according to systematic review standards, 30 primary studies and nine review-articles were included in the systematic review. The included primary studies showed great heterogeneity, both in relation to how physical activity is defined and how the various outcome variables are measured. Based on these observations, and the great variability in study designs, it was concluded that a meta-analysis could not be conducted. Instead, a qualitative synthesis was conducted, where the studies were examined side-by-side to identify common features and themes across the studies. A number of outcome variables on physical health showed small but significant effects. On the other hand, the effects on and correlations between physical activity and outcome variables related to mental health, learning outcomes and learning environments were generally small, contradictory, or simply non-existing. Thus, it is impossible to pin out a specifically effective physical activity on other outcomes than physical health. However, the synthesis shed light on key aspects that seem to be of importance in relation to how the physical activity is designed and conducted. As long as the physical activity is designed to increase physical fitness, the actual nature of the activity seems to be of less importance. In general, activities that encourage social relations or include team-based activities are more likely to be successful. Often, there is an explicit or inherent pre-assumption in the literature that physical activity has positive effects on learning outcomes and other school related variables. The results from the systematic review are inconclusive on this point. This paper highlights this issue and raise questions why a positive effect on physical health seldom is acknowledged as an end-point in its own right.

*Keywords: Physical activity, physical health, mental health, learning outcomes, learning environment, secondary school, systematic review.*

## **EFFECTS OF TRADITIONAL AND HIGHLY EMOTIONAL PHYSICAL EDUCATION PROGRAM IN HIGH-SCHOOL STUDENTS**

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Previous studies have shown a decreasing involvement of youth populations into physical activity. Thus, it was suggested to include motivating activities in physical education (PE) school programs. This study aimed to compare, in high-school students (mean age: 15 yrs), the effects of a traditional (TR) and a highly emotional (HE) physical education program. 96 boys (TR:46; HE:50) and 69 girls (TR:34; HE:35) were involved. In both groups, the activity consisted of two 1-hr session/week throughout the school year. HE included pre-acrobatics, climbing, diving, skating, frisbee, beach tennis, and sailing. In TR, typical activities characterising the national PE programs were proposed. The following test battery was administered: standing broad jump (SBJ), hand-grip strength (HG), endurance (Leger), dynamic balance, Sit&Reach (SR). Furthermore, the students completed the following questionnaires: Self-Efficacy, Psychobiosocial states (PBS), Physical Activity Enjoyment Scale (PACES), Physical Self-Description Questionnaire (PSDQ). There was a significant increase (3 kg) of HG strength in boys of both groups, and in girls of the TR group. Both groups and sexes showed slightly (1-5 cm) increased SBJ, slightly decreased endurance, and improved balance (0.5-0.7 m/s). SR showed a significant improvement (3 cm) in the TR group (both sexes). Self-efficacy decreased in boys of the HE group, and increased in girls of the TR group. In both groups, boys showed increased scores in the PBS and PACES questionnaires, whereas girls showed small improvements in the PBS score. Boys of the TR group improved the score in the self-esteem scale of the PSDQ questionnaire, whereas girls of the TR group showed a worsened score. Finally, in the TR group, students of both sexes improved the score in the activity scale of the PSDQ. In summary, varied effects of PE were observed on physical fitness and psychosocial variables, according to the sex of students and the type of proposed activity.

*Keywords: youth population, physical education programme, PSDQ questionnaire*

**TABLE TENNIS AS THE THIRD LESSON IN THE SYSTEM OF PHYSICAL EDUCATION IN PRIMARY SCHOOL CHILDREN**

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In this work presented for publication is reflected the experimental material for realivation of socially important task like the educational process in school of the Republic of Moldova, which consists of the application of new qualitative approaches and techniques. In the secondary schools (gymnasiums) where are planned still 2 lessons of physical education a week and which undoubtedly are not enough, there is a need to intensify the existing motor activities in the primary school pupils especially, in the regime of training process with the addition of new simple but developing kinds of motor activity of sports character. Such kind of sports activity can be table tennis.

*Keywords: educational process, physical culture, lesson of physical education, primary school, table tennis, motor activity, children.*



**CAPTURING THE REALITIES OF SPORTS PROGRAMMES: SYSTEMATIC ‘MESSINESS’?**

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Early workings based on traditional methods (Schuman, 1967, as cited in Clarke and Dawson, 1999) have given way to more pragmatic, social paradigms with scientific realism (Pawson and Tilley, 1997) and evaluation utility (Patton, 2002) establishing evaluation research as a specialist area of applied social research. There has been more pressure for those who work in community sport to deliver with evaluation in mind. This can be interpreted as the government demanding greater accountability for its investment, but it is more than that. Community sport needs to modernise. It needs to be able to fully explain not just what works but why it works. Given the current economic and political instabilities, sport needs to work harder than ever to establish itself as a mainstream function of our communities needs and development (Coalter, 2007). Evaluation may not be a panacea but it will provide support in terms of evidence based decisions and stronger rationales for community sport’s existence. Evaluation is not an exact science and draws on a number of disciplines, using an eclectic repertoire of concepts and methods (Rossi, et al. 2004). To this end, this positional paper will reflect on the processes of a six year community sport and physical activity strategy evaluation. Recommendations based on the reflection will be acknowledged. The strategy and the evaluation (Daniels, 2016) were developed by the Community Sport Network for this region and involved expertise from the Manchester Metropolitan University, public sector sport development and third sector sports clubs whose projects were supported by Sport England’s Community Investment Fund. The paper will present outcome patterns for the strategy and explain the methods that helped build them.

Keywords: *community, sport programme*

## **ANALYSIS OF EFFORT DURING EXERCISE WITH FREESTLYER™ ELASTIC TUBES OF DIFFERENT RESISTANCE**

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Workouts on Freestyler™ board are performed with stretching elastic tubes which are attached to arms and legs. The aim of the study was to investigate the effects of exercises with Freestyler™ elastic tubes of different resistance on heart rate frequency. Eleven males (Age  $23.4 \pm 1.1$  years; Height  $181.6 \pm 3.1$  cm; Weight  $81.4 \pm 4.9$  kg) participated in the study. Effort was assessed with measuring heart rate (HR) frequency. To get data of maximum HR frequencies (HRmax) an intermittent Fitness test 30-15 (Buchheit, et.al, 2009) was used. Relative HR frequencies (% HRmax) were calculated using Karvonen formula (Karvonen, J. and Vuorimma, T., 1988). One-way analysis of variance - Repeated measures was used to analyse the effects of exercises with elastic tubes of different resistance. The results showed that in relative HR frequency (% HRmax) ( $F(4, 40) = 161, 906$ );  $p = .000$ ) are statistically significant differences when performing exercises with elastic tubes of different resistance. It could be concluded that doing the same exercises with Freestyler™ elastic tubes of different resistance could increase the relative HR frequency from 19 % to 43 % compared to no additional resistance.

*Keywords: Effort, HR frequency, Freestyler™ board*

**DIFFERENCES BETWEEN CHANGES IN MOVEMENT DYNAMIC AND OVERALL PERFORMANCE IN THE LATIN-AMERICAN DANCE SAMBA**

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Movement dynamic in Latin-American dances differ according to the characteristics of each dance, choreography and the dancer's technical and tactical skills. Dancers in samba circle around the entire dance floor or use only one part of it due to different choreography elements and hence intensity of movement. The aim of this study was to investigate changes in movement dynamic in samba by using different speed classes and establish the connection between movement dynamic and dancer's success. The sample represented 48 dancers divided into three quality groups based on their ranking at the International competition Slovenia Open 2012. Using the method of computer tracking system Trecker, four speed classes (SC) were selected to analyze movement dynamic (SC1: 0 – 0.4 m/s, SC2: 0.5 – 0.85 m/s, SC3: 0.86 – 1.6 m/s, SC4: > 1.6 m/s). The dancers' average speed was  $0.91 \pm 0.1$  m/s, dancing mostly in SC2 (31%) and SC3 (30%) and less in SC1 (24%) and SC4 (15%). The longest duration of single phases was in SC4 ( $M = 0.52 \pm 0.2$  s). More successful dancers had shorter duration of single phases in all speed classes and significant differences were noted between quality groups in SC2 ( $\chi^2 = 14.7$ ,  $df = 2$ ,  $p = 0.001$ ) and SC3 ( $\chi^2 = 6.6$ ,  $df = 2$ ,  $p = 0.04$ ). Short duration of single phases in each speed class shows frequent acceleration and deceleration of dancers during the performance. However this also demands higher physical preparation of the dancer. Results of this research could help coaches and dancers to understand the importance of movement dynamic in samba and could be used as guideline when composing samba choreography and preparing the training process.

Keywords: *dance, samba, technical skills, tactical skills, performance*

**A COMPARATIVE ANALYSIS OF THE EFFECTS OF DIFFERENT DEFENSIVE ORGANISATIONS ON TEAMS' MOVEMENT INTENSITY AND DEFENSIVE PERFORMANCE DURING SOCCER MATCHES IN WC 2014**

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Man- and zone-oriented defensive playing styles are the two main ways in which soccer teams use to organise their defensive play. Most teams' defensive organisations consist of a variant in the combination of both man- and zone-oriented and that only few teams employ the extreme forms of these styles. Despite of their clear distinctions, the empirical evidence to account for the claimed differences between these two defensive styles in practice is rarely found in the literature. In addition, a new form of defensive organisation characterised by exerting aggressive group-pressure on the ball has emerged in modern soccer. In the present study we explored the effects of different defensive styles, namely man-oriented, zone-oriented and aggressive group-pressure, on teams' movement intensity and defensive performance. We conducted a comparative multiple-case study of Argentina (n=5), Chile (n=3) and Netherland (n=4) national teams' 90-minute matches. Results show that type of defensive organisation had a significant influence on HI distance ( $F_{2,9} = 4.6, P = 0.041$ ) and Sprint distance ( $F_{2,9} = 7.6, P = 0.012$ ), as well as a strong tendency to significant influence on the number of conceded free kicks ( $F_{2,9} = 4.1, P = 0.054$ ) per match. For example, Chile ( $342 \pm 85.9$  m) performed significantly more Sprint distance per match than both Argentina ( $182.0 \pm 17.6$  m;  $P=0.015$ ) and Netherland ( $290.8 \pm 57.6$  m;  $P=0.056$ ). Regarding defensive performance, Netherland tended to concede more free kicks per match ( $21.4 \pm 7.2$ ) than Argentina ( $9.3 \pm 2.2$ ;  $P=0.060$ ), but not Chile ( $18.0 \pm 8.5$ ;  $P=0.323$ ). The differences specific to defensive organisation were evident, especially in teams' movement intensity. Chile's aggressive group-pressure proved to be the most physically demanding and that man-oriented defence practiced by Netherland showed the highest risk of conceding free kicks. Employing zone-oriented defence, Argentina reached the final with the least high intensity activities and lowest number of conceded free kicks per match.

*Keywords: Soccer, match performance analysis, movement intensity analysis, defensive playing style, defensive organisation*

## **ANALYSIS OF THE VOLLEYBALL SKILLS ON YOUTH WORLD CHAMPIONSHIP FOR MALE AND FEMALE**

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Match analysis is crucial in order to achieve a good performance in team sports especially in volleyball (João et al., 2010). The analysis of different skills for youth players can increase the number of important information's from opponents which can help us to achieve a good competitive results. The aim of this study was to investigate which volleyball skills (reception, setting, attack, block, defense) can differ the winning and losing teams in high level youth volleyball (male and female). A total of 84 matches of Youth Volleyball World Championship for male (n=42) and female (n=42) were analyzed for different skills. The recording and analysis of data was performed by Data Volley software. The discriminant function analysis (DA) was used in order to identify the indicators that contribute to differences between winning and losing teams. We considered as relevant to the interpretation of the linear composites the  $|CCE| \geq 0.30$ . The significance level was set at 5%. The calculation of the results was performed by SPSS version 23.0. Regarding to the variables associated to the results of male matches showed significant differences in attack error (CCE = -0.34) that contributed to the discrimination between defeat and victory and in the results of female matches were significant differences in ace serve (CCE = 0.30). The results of present study show as possible predictor of success in a female youth Volleyball as the number of aces in serving and for male youth volleyball the errors in attack. For better understanding in female volleyball teams need to maintain consistency in strong serving and for male volleyball teams to prevent errors in attack for better efficiency in attack. These results can be helpful for coaches to emphasize importance on training for better match performance and for other volleyball experts.

Key-words: *Match Analyze, Volleyball skills, Data Volley, Youth teams.*

## EVALUATION OF MOTOR ABILITIES IN PROFESSIONAL SOCCER PLAYERS

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The purpose of the study was to evaluate motor abilities of professional soccer players. Three teams playing in the third professional league participated in this study. Team 1 (n=29, age: 23.1±3.4 years, height: 180.6±6.6 cm, body mass: 75.7±6.6 kg), Team 2 (n=23, age: 22.7±3.3 years, height: 181.1±6.2 cm, body mass: 75.9±6.6 kg), and Team 3 (n=20, age: 22.4±3.3 years, height: 180.3±6.2 cm, body mass: 77.2±5.7 kg). Yo-Yo intermittent recovery test, 10 and 30-m sprint, agility and 1- Repetition Maximum strength test were applied on the teams. Yo-Yo test and VO<sub>2</sub>max values were significantly higher in Team 3 than other teams (p<0.05). There was no significant difference between the teams in 10 and 30-m sprint performance (p>0.05). Agility was significantly higher in Team 1 than Team 2 (p<0.05). Leg extension and leg curl was significantly higher in Team 1 than other teams (p<0.05). Significant correlations were found between the strength and agility in professional soccer players (p<0.05). The study showed that different level of motor ability can be exhibited in the same league teams. In addition, it was revealed that there was a relation between strength and agility in professional soccer players.

*Keywords: soccer, endurance, agility, strength*

**THE AREA OF THE COURT IN WHICH FOUR SUCCESSIVE OPPONENTS OF THE WORLD NO. 1 PLAYED THEIR SHOTS IN THE 2011 BRITISH GRAND PRIX**

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Squash tactics have been frequently analysed based on shot types played in different court areas, players' movement characteristics and their positioning on court before, during and after the shot action. These parameters were subsequently used to determine tactical pattern of players of different playing standards. From a general prospective these results were valuable for coaches and players, however these methodologies did not allow individual patterns of play or tactics to be observed and quantified. Therefore, the aim of this study was to determine whether the world's number 1 player changes his tactics and therefore opponent's shot locations while playing against the same and different individual players. Four matches involving the World No. 1 male squash player at the 2011 British Grand Prix Tournament were analysed. A computer tracking system 'Tracker' was used to divide the court floor into 15 areas to determine the ball impact position for opponent's shots, excluding serve and return of serve. These were compared within and between matches using Chi-Square tests. Opponent's World rankings progressively improved through the tournament (54, 24, 4, and 2). The distribution of return shot areas remained more consistent within matches (only match 3 (3-1 win) had a significantly different pattern of shots, Chi-square = 61.5, df = 42,  $p < .05$ ,  $\phi = 0.4$ ) than between matches (Chi-square = 110.2, df = 42,  $p < .001$ ,  $\phi = 0.3$ ) with a high proportion of shots played from the back of the court. In the first match (3-0 win) the opponent played 67.4% of shots from the back corner (SD = 2.9%). In match 2 (3-0 win) these values reduced because either the opponent was able to volley the ball before the ball reached the back of the court or the player played a more attacking game by hitting the ball lower (mean = 53.6%, SD = 3.2%). Match 3 (3-1 win) involved 3 games won by the World No. 1 with the opponent playing shots at the back of the court less (mean = 54.5%, SD = 4.8%) than the game lost (65.2%). In the final match (lost 1-3) the opponent played 59.3% of shots from the back of the court in the first game (won) but less in the 3 games lost (mean = 48.2%, SD = 5.1%). The areas in which the opponent returned shots varied between matches which was likely to be due to differences in opponent quality, tactical preferences and match outcome. In this small study the opponent in the tournament final played a higher proportion of shots towards the front of the court which may have been due to a tactical change by the World No. 1, a consequence of losing the match or the playing style of the opponent. Larger studies involving more parameters e.g. shot types and the time available to play shots are required to better understand player tactical profiles.

*Keywords: squash, player movement, player positioning*

## **ANALYSIS OF MOVEMENTS PERFORMED DURING YOUTH TENNIS GAMES**

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Tennis is an intermittent sport with repeated short actions characterised by very specific movements performed in response to equally specific and uncertain play situations. Although the effectiveness and variability of these movements are influenced by players' individual anthropometric and fitness characteristics, some common traits can be recognisable among all athletes, which require them to learn different techniques to better perform. Hence, knowing the players' movements profile can help to improve the efficacy of these techniques. Therefore, this study aimed to investigate the movements performed by tennis players during real games. Methods: Forty-eight young players, equally distributed (n=12) in two male and female categories (Under14 and Under12) were observed during a youth local tournament. Movements were classified within 11 categories: 1) Lateral Movement (LM); 2) Shuttle (SH); 3) Lateral “V” (LV); 4) Forward “V” (FV); 5) Inverted “L” (IL); 6) “L”; 7) Diagonal+Forward (DS); 8) Diagonal+lateral (DL); 9) Arc Forwards (AF); 10) Arc Backwards (AB); 11) Diagonal (D). An Independent T test, with data split for sex (M and F) and age-category (U14 and U12), was applied for movement analysis. Results: Data split for sex showed differences between age groups for SH ( $p = 0.016$ ), AF, AB and D ( $p < 0.001$ ) for male athletes, and differences for LM, LV, FV, DL and D ( $p < 0.05$ ) for female ones. Data split on age-category showed differences between sex for LM, FV, IL, DL, and S2 ( $p < 0.05$ ) and LV, DS and AB ( $p < 0.001$ ) for U14, and differences for AB ( $p < 0.001$ ) for U12. Discussion: Results showed as the differences between sex and age groups were mostly related to movements that require a higher demand of acceleration and/or change of direction. Thus, understanding the movement strengths and weakness of young tennis players will help coaches to develop specific training programs.

Keywords: *youth, tennis, movement analysis*



## **COPING WITH RETIREMENT FROM AN ACTIVE SPORT CAREER - THE CASE OF SLOVENIAN HANDBALL PLAYERS**

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Competitive athletes are confronted with a number of adjustments during the career ambition process. The purpose of the study was to evaluate the transition from active into non-active career. The basic aim of the study is to find out how some former handball players perceive their sporting careers and how satisfied they are nowadays with the quality of life. The analysed sample includes 106 non-active handball players, all participants of the veteran's tournament. The data was collected from a questionnaire and analysed with using SPSS package. Method of linear regression and Pearson's correlation coefficient were used. The results of our study showed that most of the former handball players are satisfied with their previous sport careers. Most of them believe that they could have reached more of the racing successes, but they are basically satisfied with their sport career. To familiarise themselves with their life after the career in sport was problematic and difficult for most players, but it was easier for them to adapt to post sport careers via entering into the world of veterans attendees. The correlation between reasons for the conclusion of a career in sport and the problems of the sport retirement process is not really high ( $r = 0,343$ ). Many former handball players are coping with retirement from an active sport career via attending the veteran's tournament. Those players are in general not very satisfied with their active careers, but quite happy with their nowadays life, also because they are a part of the veterans social net. For further studies we would suggest comparing the career transition and the lifestyle of veterans' sport attendees (handball social net), with the players who are totally out of handball social life.

*Keywords: handball, sports career, retirement*

**SPORTS CAREER AND EDUCATION SPORTS CAREER AND EDUCATION OF TOP NORDIC ATHLETES: COMPARISON BETWEEN THE SLOVENIAN, ITALIAN AND NORWEGIAN ATHLETES**

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The phrase dual career (the term was first written down in 2007, European Commission) indicates the career of the athletes who coordinate their sport activities with education during their sports career. Top athletes are often faced with problems regarding coordination of sports career and education. The purpose of the study was to determine the course of a dual career, coordination of school and sporting obligations of Norwegian, Italian and Slovenian top Nordic athletes. We tried to find out whether there are differences among countries in terms of education, training and competitions in relation to athletes of different Nordic sports and what problems these athletes face while they coordinate a dual career. The study was conducted on a sample of 174 top Nordic athletes from Norway, Italy and Slovenia that compete at the highest level of competitions (Olympic Games, World Championships, World Cup) and come from the following sports disciplines: cross-country skiing, ski jumping and biathlon. Data were collected through an online questionnaire, which was used to determine the characteristics of athletes' dual careers. The survey was carried out during the World Cup in the 2015–16 season. The results were analysed by the means of descriptive statistics with cross-tables, and non-parametric chi-square test was used to determine the statistical relationship between individual variables. The results show that Norwegian athletes have less difficulty in coordinating school and sporting obligations than Slovenian Nordic athletes. 85% of Norwegian athletes managed to complete their education at a certain level and then they completely devoted themselves to sports career, while the majority of Slovenian athletes (63.6%) dropped out of school due to sport already in middle school or at higher levels of education. 37% of Italian athletes terminated schooling, while 39.1% did not continue to a higher level of education due to their sports career. Based on results of the study, consideration may be given regarding the modification of competitive system in Slovenia, especially in relation to cross-country skiers and biathletes. The existing system is far too competitively oriented and requires premature specialization. Depending on the specific needs of Nordic skiers (snow, sports infrastructure), consideration may be given regarding special secondary schools in Slovenia, following the example of Norway, where all perspective Nordic skiers would educate and stay in one place, provided with teachers and sports coordinators, while Slovenian Ski Association would ensure trainers and other professionals.

*Keywords: education, sport, dual career, competitive systems, education system, sports career, Nordic sports*

**YOUNG ATHLETE AND CHALLENGES OF NATIONAL IDENTITY: THE CASE OF JAKOV FAK**

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Jakov Fak is a very successful Croatian/Slovene athlete. When he won a bronze medal for Croatia in 2009, his sport (biathlon) was almost unknown for Croatian public. But, he became a part of the media headlines because he had announced transfer to Slovenia in order to gain better training conditions. Apart from life challenges (training, hard work, competitions, living space, quality of life, family etc.) he had to face specific challenges regarding ethnic/national identification. In Croatia (like in many other post-socialist countries) question of ethnic/national identity is very important social issue. The case of Jakov Fak is sociologically interesting because we could observe how individual, sport related choices brought questions of national (ethnic) identification to broader public, in this case bringing heavy burden on the shoulders of a young athlete. What should one do when your own country calls you a traitor if you decide to leave and join another country's team? Questions of training and ways to gain sport success in this case are closely linked with questions of media attention and national/ethnic discourses as well. This paper deals with the case of Jakov Fak who made his choices, despite having to face unusual challenges for a young athlete.

Keywords: *national identity, young athletes*

**DIFFERENCES IN THE DUAL CAREER PATHS OF STUDENTS ATHLETES IN SLOVENIA, CROATIA AND SERBIA**

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The purpose of this study was to determine the characteristics of dual career of athletes and their motivation for a dual-career path. To this purpose we used SAMSAQ-EU questionnaire completed by student athletes, actively competing during their regular studies (on local, national or international level) and enrolled in the Faculty of sport in Slovenia (N = 117), Croatia (N = 123) and Serbia (N = 165). The study between these free countries is interested because all those countries have no determinant system or low how they help students' athletes. More or less everything depends on each athlete and how he or she can negotiate for students' benefits during the study age. The established hypotheses relate to the motivation for the study and for the sports. We have tried to determine whether there exist differences in motivation among different countries. Using the appropriate statistical methods. We have found out that there exist statistically significant differences in motivation to study among the students in Slovenia, Croatia and Serbia. We will evaluate the results by trying to support which country has better support system for student athletes and why. In addition, we will try to suggest changes in system for higher motivation students athletes.

*Keywords: dual career, student-athlete, sport, elite sport, academic, motivation*

**SIMILAR CARDIORESPIRATORY EFFECTS OF HYPOXIA DURING CYCLING AND SIMULATED SKIING IN ADULTS AND CHILDREN**

**Kapus, J.<sup>1</sup>, Mekjavic, I. B.<sup>2</sup>, McDonnell, A. C.<sup>2</sup>, Ušaj, A., Vodičar, J.<sup>1</sup>, Najdenov, P.<sup>3</sup>, Jakovljević, M.<sup>4</sup>, Jaki Mekjavic<sup>5</sup>, P., Žvan, M.<sup>1</sup>, Debevec T.<sup>2</sup>**

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Alpine skiing is a popular activity enjoyed by many generations. Recently, suitable skiing conditions are often only found at high terrestrial altitudes. Altitude-related reduction in O<sub>2</sub> availability is known to provoke a dose-dependent decrease in aerobic capacity. Maturation has been shown to significantly influence exercise ventilatory and cardiac control. Therefore, the purpose of the present study was to comprehensively compare the effects of hypoxia on cardiorespiratory and performance indices during submaximal cycling and simulated skiing between adults and children. We tested two groups of healthy, low-altitude residents (Adults, N=13, Age=40±4 yrs.; Children, N=13, Age=8±2yrs.) in normoxic (Nor: FiO<sub>2</sub>=0.209; PiO<sub>2</sub>=134±0.4mmHg; 940m) and normobaric hypoxic conditions (Hyp: FiO<sub>2</sub>=0.162±0.003; PiO<sub>2</sub>=105±0.6mmHg; ~3000m) following an overnight acclimation to hypoxia (≥12-hrs). The participants underwent a graded cycling test and a simulated skiing protocol in both conditions. Minute ventilation (VE), oxygen uptake (VO<sub>2</sub>), heart rate (HR) and capillary-oxygen saturation (SpO<sub>2</sub>) responses were assessed throughout the tests. Knee extension/flexion maximum voluntary contraction was also assessed as an index of knee strength. The cycling data were interpolated for two relative workload levels (1 W·kg<sup>-1</sup> & 2 W·kg<sup>-1</sup>). Higher resting HR in hypoxia, compared to normoxia was only noted in children (Nor: 78±17; Hyp: 89±17 beats·min<sup>-1</sup>; p<0.05) while SpO<sub>2</sub> significantly decreased in hypoxia in both groups (Nor:97±1%; Hyp:91±2%; p<0.01), with no between-group differences. The VE, VO<sub>2</sub> and HR responses were higher during hypoxic compared to normoxic cycling test in both groups (p<0.05). Except for greater HR during hypoxic compared to normoxic skiing in children (Nor:155±19; Hyp:167±13 (beats·min<sup>-1</sup>); p<0.05), no other significant between groups differences were noted during cycling and skiing protocol. Also, no differences between normoxia and hypoxia were observed in muscle strength responses between groups. Taken together, these data suggest that cardiorespiratory responses to submaximal cycling and simulated skiing in hypoxia are comparable between adults and children.

*Keywords: cardiorespiration, children, adults, hypoxia, cycling, skiing*

**MUSCLE OXYGENATION AND CARDIORESPIRATORY RESPONSES DURING INCREMENTAL EXERCISE IN CHILDREN AND ADULTS**

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While cardiorespiratory responses to incremental exercise might be similar between children and adults, recent evidence suggest that muscle energetics might be different. In particular, it is currently unclear if exercise muscle oxygenation responses are influenced by maturation. This study aimed to determine whether muscle oxygenation and cardiorespiratory responses are comparable between children and adults during an incremental exercise. **METHODS.** Nine pre-pubertal children (BM= 33±6 kg, AGE= 8±2 yrs.) and seven adult males (BM= 80±8 kg, AGE= 41±3 yrs.) performed an incremental test on cycle ergometer. Minute ventilation (VE) was determined using a metabolic cart (CPET, Cosmed) and near infrared spectroscopy (Oxymon MK III, Artinis) was employed to assess vastus lateralis oxygenated hemoglobin (O<sub>2</sub>Hb), deoxygenated hemoglobin (HHb) and total hemoglobin (tHb). The values of the corresponding thresholds were calculated based on the same V-slope method intersection of regression lines. Additionally, the dynamics of changes in parameters were calculated as the changes relative to power outputs. All data were normalized for body mass (BM). **RESULTS.** Both, the threshold for HHb (Adults=1.5±0.4 W·kg<sup>-1</sup>; Children=2.4±0.4 W·kg<sup>-1</sup>; p=0.007) and O<sub>2</sub>Hb (Adults=1.5±0.4 W·kg<sup>-1</sup>; Children=2.2±0.4 W·kg<sup>-1</sup>; p=0.009) were lower in adults than in children. In contrast, the ventilatory threshold reached similar values (Adults=1.53±0.53 W·kg<sup>-1</sup>; Children=2.25±0.77 W·kg<sup>-1</sup>; p=0.06). However, when comparing the changes in O<sub>2</sub>Hb during incremental test ( $\Delta$ O<sub>2</sub>Hb/ $\Delta$ P·BM<sup>-1</sup>) between adults (-0.36±0.76) and children (-3.38±2.02 AU/W·kg<sup>-1</sup>), significant differences were noted (p=0.02). In contrast,  $\Delta$ HHb/  $\Delta$ P·BM<sup>-1</sup> in adults (1.38±0.43) and children (3.39±2.46 AU/W·kg<sup>-1</sup>) were comparable (p=0.06). **CONCLUSIONS.** While normalization by body mass abates the absolute differences in ventilatory threshold between children and adults the differences in muscle O<sub>2</sub>Hb and HHb thresholds are still noted. This suggests, that other factors than maturation and /or body size, are involved in the observed muscle oxygenation kinetics differences.

*Keywords: muscle oxygenation, cardiorespiration, exercise*

## **VALIDITY OF DIFFERENT SYSTEMS FOR TIME MEASUREMENT IN 30M-SPRINT TEST**

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Sprinting is a key factor in many sports and specific sprint tests are often performed to detect talent in youth. The main purpose of this study was to assess the validity and the reliability of two 30 meter sprint tests using different starting conditions: from rest (RST) and from a flying start (FST). In addition the aim was to verify the differences in measurement between a high frequency camera (250 Hz) and photocells (1000 Hz). Participants (81 Bologna's scholars and university student, between the age of 4 and 25 years old,) were divided in four age groups: 4-6 y; 7-9 y; 10-12 y;  $\geq 13$  y. Reliability has been studied with Cronbach's alfa. A study of the errors (Bland-Altman Plot), has been ran to compare the two methods of times measurement. The error series has been controlled by video analysis. The duration of the acceleration phase and the maintenance of the maximum speed has been measured in each group. The correlation between the output data of the two system of measurement was of 0.92. The reliability was between 0.94 and 0.98 for the RST and between 0.92 and 0.98 for FST using both methods of measurement. Reliability increased with the age of the participants, while the numbers of errors was inversely related to that. The variability of the individual running technique may have influenced errors. The acceleration phase in all the groups occurred at least in the first 15 meters sprinting. A slight decrease (0.30-0.32 m/s) in speed after 20 meters was observed in participants under the age of 13, while older participants were able to maintain the speed to the end of the 30 meters run. The sprint test showed a high validity and reliability in young participants. High speed camera and photocells can be used alternatively for this purpose.

*Keywords: 30m running test, scholars, students*

## **IMPROVING GRIP STRENGTH OF G-JUDOKAS**

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Judo, as a defensive martial art and combat sport, is practiced on tatami (mats) and offers many safe training options for different levels of knowledge and motor skills. G-judo is adjusted judo for people with mental and physical disabilities. To improve their techniques and strength we decided to do some measurements of physical strength. For judo, as a grappling sport, the strength in hands is one of the key skills, therefore we performed measurements of hand grip strength. Measurements were performed on a chassis dynamometer Camry EH101 on a 17 (4 girls in 13 boys) athletes with special needs. Measurements showed average grip strength of  $21.3 \pm 9.3$  kg in the dominant side and  $19.27 \pm 7.83$  kg in non-dominant side. A statistically significant difference between dominant and non-dominant hand was found. After initial measurements we selected a few grip strength exercises which were practiced by G-judokas twice a week during their regular one-hour training for one month. New exercises brought enthusiasm in both G-judo groups. All exercise contained gripping and pulling. Results of the second measurement have shown improvement of grip strength. In the process of reviewing the data we detected that the hand grip dynamometer can also be used for detecting handedness for people who cannot or do not know how to write.

*Keywords: G-judo, mental and physical disabilities, techniques, physical strength*



## COMPARISON OF TAKE-OFF ACTION BETWEEN 3-STEP APPROACH AND 7-STEP APPROACH

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Athletics is one of the world's oldest sports. It is divided between running, throwing and jumping. High jump is classified as one of the jumping events. Throughout the years, it has developed vastly with the help of different jumping techniques. One of those is scissors technique. Using this very technique, we studied the effects of long versus short approach on kinetic and kinematic variables, and how they alter by changing the height of the bar. 7 female athletes (long jumpers and high jumpers) took part in the research, who are well acquainted with the scissor technique. We analyzed the acquired data and presented them using the SPSS (program for statistic data analysis). We used the one-way ANOVA test to compare results within the same approach length, and to compare results between different approach lengths, we used the paired sample test. We found no statistically significant differences with none of the variables between the same approach length and different bar height. However, there were noticeable differences with seven of the variables, when we compared the short and long approach: horizontal force, approach speed, the angle between the body and the ground at the first contact with the take-off position, the knee angle in the final takeoff position, the length of the penultimate stride and the length of the last stride. The variables' values of vertical passive and active force, contact time, acceleration time at the end of take-off, knee angle in the starting take-off position, biggest amortisation knee angle, the difference between these two angles and the angle between the body and ground at the end of take-off did not change in reference to the approach length. Three-step approach and seven-step approach are different from one another, so short approach is not useful for perfecting rhythm of approach and take-off technique.

*Keywords: track and field athletics, jumping techniques*

**DIFFERENCES IN MUSCLE ACTIVATION BETWEEN PUNCHES WITH AND WITHOUT IMPACT ON THE TARGET**

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The purpose of this study was to establish the differences between punches with impact on target and punches without impact on target through monitoring physical characteristics and electromyography. Methods: The research included 11 participants, students of Faculty of sport in Ljubljana. After a standard warm-up, the participants did 12 direct forward punches from a static position, 6 of which were done to force plate which was covered with target made of soft materials. The Biovision System (Warheim, Deutschland), was used to record the force and EMG signals of m. triceps brachii (agonist) and m. biceps brachii (antagonist) to monitor muscle activation. Some physical characteristics of punches were monitored with an accelerometer MTx (the Xsense Company, Enschede, Netherlands). A common arithmetic mean of all variables for each participant and for the entire sample of participants was calculated. Paired samples t-test was used to check for the differences between the punches with and without impact. Results: Results showed that the time of punches without impacts on target were statistically significantly shorter. In addition, the activation of agonist muscles was statistically significantly higher in punches without impacts.

*Keywords: karate, martial arts, punch, triphasic electromyographic pattern, ballistic movement*

**HOW FAST YOUNG SOCCER PLAYERS ARE ABLE TO RUN IN A MATCH CONDITION, COMPARED TO HOW FAST THEY ARE IN A MAXIMAL FIELD TEST?**

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This study aimed to investigate the relationship between players' maximal sprint speed performed during a field test (MSS<sub>test</sub>) and actual speed running during in-game actions (ASR<sub>game</sub>) in youth soccer matches. Fourteen outfield young players (born in 2003) from the same U14 team were observed during the first halves of three official matches. The playing time (35 minutes per half) was divided in three sub-periods: 0-10 min (P1), 10.01-20 min (P2) and 20.01-35 min (P3). Considering the team 4-4-2 system of play, players were assigned to 5 role groups (n=2 per group): full- (FB) and center- (CB) backs, wide- (WM) and center- (CM) midfielders and strikers (S). The MSS<sub>test</sub> was defined as the fastest speed over any 10-m interval measured during a 40-m sprint test, while ASR<sub>game</sub> were classified as: medium- (MI) and high- (HI) intensity and sprint (SP). The observed movements distribution (MI: 13.9%; HI: 47% and SP: 30.1%) was significant ( $p < 0.001$ ), as well as the association between movements and roles ( $p < 0.001$ ) which showed for WM and S the higher “within-roles” SP percentages (48.9% and 47.1%, respectively). The significant association between periods and movements ( $p < 0.05$ ) showed a higher “within-periods” SP percentage during P1 (37.7%) compared to P2 (30%) and P3 (32.3%). A significant influence of roles ( $p < 0.05$ ) was also observed for actions duration and distances covered, with most of SPs performed up to 10 m. Although, few in-game SP actions were even performed at higher speed compared to MSS<sub>test</sub>, a mean range of 65-70% of MSS<sub>test</sub> characterized most of these actions, with the higher range of percentage (70-80%) related to the shortest class of distance (0-10 m). These findings demonstrated how the relationship between MSS<sub>test</sub> and ASR<sub>game</sub> was modulated by tactical constraints. Hence, in youth soccer the in-game performance rather than maximal performance may be of greater relevance.

*Keywords: soccer, maximal speed, competition, field test*

## IMPACT OF 1 YEAR JUDO PRACTICE ON BODY SYMMETRIES IN YOUTH JUDOKAS

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Judo is a combat sport with techniques that require forceful gripping of the opponent judogi. Therefore, judo performance is associated with maximal force production and strength of the judokas. According to several researches, body asymmetries can lead to occurrence of injuries. The aim of this paper is to assess the effect of a year training process on the body symmetries of youth judokas in their puberty period between 2015-16 competitive season. Seven young trained male judokas (Mean  $\pm$  SD; at beginning of study: age  $14,33 \pm 0,64$  years, height  $171,01 \pm 9,69$  cm, body mass  $62,99 \pm 8,97$  kg; and at the end of the study: age  $15,53 \pm 0,64$  years, height  $176,51 \pm 9,71$  cm, body mass  $72,01 \pm 7,25$  kg) with national and international competitive experiences participated in the study. Body symmetries were measured with 3D scanning technology NX-16 and bioelectrical impedance Inbody 720. The collected data was analysed with IBM SPSS statistical package. In order to assess the differences between the left and the right body segments in-between year follow up the ANOVA for repeated measured was performed alongside Paired Samples t-test. Statistical significant difference between right and left variables was found in Forearm girth ( $p=0,01$ ), Mid-Thigh girth ( $p=0,02$ ) and Calf Girth ( $p=0,03$ ) at the beginning stage of the study, whereas at the end, after a year of training process, the asymmetry was found in Elbow girth ( $p=0,03$ ) and Forearm girth ( $p=0,02$ ). The majority of differences between sides of the body segments were found significant between initial and final measurement. The effect of a one-year training period on the whole group is evident, and the collected data enables us to prepare individual training programs to eliminate certain asymmetries that can lead to sport-specific injuries.

*Keywords: youth judokas, 3D scanning, puberty, asymmetries*

## **DRAG FACTOR ON ROWING ERGOMETER DURING 2000-M PERFORMANCE IN YOUNG ROWERS**

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Indoor rowing is relevant for indoor training/testing and 2,000m competitions are organized at national and international levels using the Concept2 rowing ergometer, which permits resistance adjustments via a vent damper. To set the damper lever, indoor rowers can vary the drag factor (df) by setting the flywheel cage from 95df to 220df, with higher df levels recommended for heavier rowers with respect to their lighter counterparts<sup>1</sup>. To evaluate the impact of different df settings on a 2000-m rowing ergometer performance of young rowers in relation to their weight. On three separate occasions organized on consecutive days, fifteen youth male rowers (age: 16.1±1.1yrs; body mass: 72.7±9.6kg; height: 177.4±6.4cm) performed maximal 2000-m rowing ergometer performances on a Concept2 (mod.D) with a 110df, 130df, and 150df, respectively. Average times (T110, T130 and T150) and stroke rate (SR110, SR130 and SR150) were measured. Pearson’s correlation was applied to examine the relationship between anthropometric characteristics of athletes and their 2000-m performances. Slowest 2000-m rowing ergometer performances resulted in T110 435.0±22.7s, intermediate in T150 433.7±25.2s, and fastest in T130 419.1±24s, a highest SR at 110df (SR110=35.1±0.8n.min<sup>-1</sup>), intermediate at 130df (SR130=36.7±0.7n.min<sup>-1</sup>), and lowest at 150 df (SR150= 32.7±0.7n.min<sup>-1</sup>). Rowing performances were significantly (P<0.001) correlated to body weight (T110 : r=0.79; T130 : r=0.86; and T150 : r=0.84), and height (T110: r=0.78; T130: r=0.83; T150: r=0.85). The fastest time and highest SR reached during 2000-m indoor rowing performances with a 130df setting could suggest coaches to favour this resistance level, independently from the anthropometric characteristics of youth athletes.

*Keywords: young rowers, drag factor, rowing ergometer*

## EFFECTS OF IN-SEASON STRENGTH TRAINING IN MALE AD FEMALE YOUTH VOLLEYBALL

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Explosive strength is a key factor for performance in volleyball. This study aimed to compare the effects of in-season strength training in male as compared to female youth volleyball players. Ten male (15.3±0.4yrs, 177.5±6.7cm, 69.1±14kg) and 13 female (15.1±0.3yrs, 168.7±7.3cm, 63.5±9.6kg) volleyball players performed a physical testing battery at the beginning of a competitive season. Testing was then repeated every three months throughout the season. The battery included the following tests: countermovement jump (CMJ), CMJ with arm swing, throwing medicine balls of different weight (1, 2, and 3 kg), and agility T-test. During the season, all the players performed one strength session per week including resistance-based training and explosive strength training. In both sexes, body height increased significantly between the beginning and end of the season, while weight showed slightly non-significant changes. Males showed a gradual significant increase of CMJ (from 40.3±8.4cm. to 42.5±6.5cm. p<0.05) and CMJ with arm swing (from 47.9±8.1cm to 51±7.2cm. p<0.05) performance across the season, while females showed small, non-significant increases in these tests (from 30.5±3.8cm. to 31.1±5.2cm. and from 34±4.6cm. to 34.7±3.7cm. respectively). The distance achieved in medicine ball throwing was improved by males across all the examined periods during the season, while females showed a significant improvement only between the beginning and end of the season, and only with the 1-kg (from 8.14±0.77m. to 8.94±0.7m; from 6.17±0.46m. to 6.56±0.69m. respectively) and 2-kg balls. (from 6.2±0.61m to 6.63±0.57m; from 4.8±0.4m. to 4.93±0.44m. respectively). Finally, the agility test presented a waveform trend in males across the season, while females showed a gradual improvement between the beginning and the end of the season. In conclusion, the present findings demonstrate that youth male and female volleyball players show partially different responses to similar strength training programs during the season, probably due to a different responsiveness to training linked to hormonal processes.

*Keywords: youth volleyball players, strength training*

**ANTHROPOMETRY, PHYSICAL FITNESS AND COORDINATION OF YOUNG FIGURE SKATERS OF DIFFERENT LEVELS**

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Appropriate talent detection and identification systems can help national federations and coaches to identify athletes and subsequently provide them with an optimal environment for development, especially in countries with a smaller talent pool or for less popular sports such as figure ice skating. Therefore, the aim of the present study is to provide the athletic profile of young female figure skaters using a generic test battery. Our first objective is to discriminate young skaters from their non-skating Flemish counterparts. Thirty-two skaters aged nine to twelve years old (11 elites and 21 non-elites) voluntarily participated in the study. They were submitted to five anthropometric, seven physical, three coordination and five ice-skating specific tests. Reference values of a representative healthy non-skating sample were taken from the Flemish Sports Compass dataset. Chronological age and biological maturity were taken into consideration in both analyses (MANCOVA). Figure skaters appeared to be predominantly average mature (93.8%), were lighter and leaner than the reference sample, and demonstrated better physical characteristics and motor coordination. No differences were observed between the elite and non-elite group regarding maturity status and anthropometric or physical parameters. Still, elite skaters scored better than non-elites on the coordination tests jumping sideways and tended to do so on the moving sideways test. Profiles of figure skaters differ clearly from a healthy reference population. Furthermore, the non-sport specific motor coordination tests allow discrimination between elite and non-elite skaters. In the future it is suggested to take KTK (or other non-skating specific motor coordination tests) into consideration in the talent identification test alongside the coaches' eye and expertise.

*Keywords: figure skating, talent identification, talent detection*

**PROTEIN FAT INDEX AT ADOLESCENT MALE ATHLETES: QUANTITATIVE CHARACTERISTICS OF NOVEL BODY COMPOSITION INDEX**

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Body composition is the term that defines the the set of substances that constitute the materially manifest structure of the human body (2). Body composition measurement refers to the proportions of the body and quantitative characteristics which are the subject of research in different scientific area, especilly in sports sciences. The main objective of this research was to determine the quantitative characteristics of Protein Fat Index (PFI), as a novel morphological index developed to define the relationship between pure contractile and ballast body tissues (1), in adolescent athletes. The sample was consisted of 199 young male athletes on 16 different sports from Slovenia (N=130) and Serbia (N=63) with following basic descriptive characteristics: Age=16.7±0.9 yrs., BH=181.8±8.1 cm., BM=74.4±11.3 kg., BMI=22.45±2.49 kg/m<sup>2</sup>, training experiance =7.8±2.4 years. The aim of research is to define a general quantitative characteristic of Protein Fat Index (PFI) as a novel body composition index. The measuring was realised by segmental multichanel bioelectrical impedance using InBody720 analyser. All measurements were conducted in the period 2014-2016 in the Exercise Physiology Lab, Faculty of Sport University of Ljubljana and Methological and Research Laboratory (MRL), Faculty of Sport and Physical Education University of Belgrade in accordance with the standard manufacturer's recommendations. The descriptive statistics results showed that the quantitative characteristics of explored index was: 2.399±1.198 index units, at 95% Confidence Interval for Mean 2.232 to 2.567 for Lower and Upper bound level, 0.633 to 6.500 index units for Min and Max value, respectively, and for the 0.0849 index units Standard Error of Measurement. Calculated percentile distribution values as initial standards for general quantitative characteristics of Protein Fat Index (PFI) was: 0.866, 1.085, 1.340, 2.127, 2.862, 4.069, 5.154 and 6.000 index units for 2.5, 5.0, 15.0, 50.0, 75.0, 90.0, 95.0 and 97.5%. The distribution shape characteristics data's showed that Skewness and Kurtosis are 1.487 and 2.267, and Kolmogorov-Smirnov Z Test value 1.854, p = 0.002, which indicate the shape of the distribution curve shifted to a lower average values of the index. The future studies indicate the need for larger subjects sample testing according to the gender, and at sample of different sports, as well.

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Keywords: *male young athletes, body composition, protein fat index*



**IS BODYWEIGHT AFFECTING POSTUROGRAPHY IN CHILDREN AGED BETWEEN 9 AND 11 YEARS? EVIDENCES OF A PILOT INTERVENTION**

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The present investigation aimed at the evaluation of the posturographic parameters in a sample of children of both sexes with the aim to better understand if posturography can be adopted and useful during school age period. A number of 74 children (10,2±0,7 yrs; 145,7±8,7 cm; 42,2±9,9 kg;) attending 6th grade school have been involved during one week data collection period (October, 2015). All children were invited to participate at static baropodometric and stabilometric analyses carried out through a force platform freeStep® and a computer software freeMed® provided by Sensor Medica® (Guidonia, Montecelio, Roma, Italy). The following variables were recorded: 1) Anthropometric characteristics; 2) Baropodometric parameters and stabilometric parameters. The data were analyzed with STATISTICA 8.0 software and the One-way ANOVA analysis and/or T-test analysis were adopted when appropriate. Participants were categorized first in Males (N 51; 10,2±0,7 yrs; 145,6±9,0 cm; 41,9±9,0 kg) and Females (N 23; 10,3±0,8 yrs; 145,9±8,3 cm; 43,0±11,8 kg). Baropodometric parameters comparison showed a left forefoot plantar surface significantly different (0.03) in males (44,5±17,1 cm<sup>2</sup>) compared to females (35,6±13,0 cm<sup>2</sup>). No differences were found in total left (males 49,8±7,9%; females 49,1±6,0%) and right (males 50,2±7,9%; females 50,9±5,9%) plantar pressure distribution; the data were normalized according with the participants' foot length in centimeters (24,4±1,1 in males vs 23,5±1,7 in females – 0.001). The stabilometric analysis did not showed significant differences between genders (CoP - Latero/Lateral Oscillations 15,5±3,1 mm in males; CoP - Latero/Lateral Oscillations 14,8±2,1 mm in females; CoP - Antero/Posterior Oscillations 17,6±2,5 in males; CoP - Antero/Posterior Oscillations 17,3±2,1 in females). In a second time, participants were categorized in weight status categories according to the international cut off points for children's body mass index provided by Cole et al, (BMJ volume 320, 6 may 2000). From underweight category up to obese category (including so also normalweight and overweight) the One-way analysis of variance was performed for all posturographic parameters. In stabilometric analysis, we found no significant differences between categories, but interestingly in baropodometric evaluations we found one completely different load distribution (left-right) while watching from underweight category up to obese category. In addition, during the t-tests comparisons we found a significant difference (0.003) between right rearfoot plantar surface in underweight children (M/F 36,7±7,4 cm<sup>2</sup>) when compared with rearfoot plantar surface of obese children (M/F 44,4±10,3). This last result confirms the interesting trend already shown by the analysis of variance (1 x 4). The posturographic evaluation (plantar pressure and centre of pressure oscillations) seems to be feasible and useful even at early age

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of 9-11 yrs. We found interesting the fact that there are intra-categories variances. Those results can help professionals to better understand underweight and obese children ontogenesis and can contribute to proper intervention plans in order to prevent musculoskeletal disorders and chronic diseases in adult age. This pilot intervention needs to be confirmed by further investigations with a larger sample and a proper investigation able to provide normative values and standardized operating procedures (SOPs) for children.

Keywords: *children, bodyweight, posturography*

**YOUTH DEVELOPMENT THROUGH SPORT: A CASE STUDY OF A DISABILITY GYMNASTICS PROGRAMME**

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The British government's newly published sports strategy (DCMS, 2015) has recognised the recent decline in participation in all physical activity and sport (Sport England, 2015) and has once again targeted those in underrepresented groups – namely, women black and minority ethnic groups and disabled people. Moreover, the Government have focussed on outcomes relating to mental health, employability and education. In the face of more spending cuts, it is the underrepresented groups that get hit the hardest (Collins and Haudenhuyse, 2015). Ironically, it is in these groups where sport is 'believed' to make the greatest gains, particularly in tackling inequality and for improving mental and social health. However, government investment and support can no longer rely on beliefs and anecdote – particularly in times of austerity. National sports programmes are tasked with explaining outcomes and providing a rich and reliable evidence base upon which progress can be made. Community sports programmes, particularly those targeting participants that are 'hard to reach' are no different. The aim of this study was to explore the experiences of a disability sports programme and identify the mechanisms and context influencing its sustainability using Pawson and Tilley's (1997) realistic evaluation framework. The findings suggest that observations of improved physical and motor capabilities and sustained engagement with the programme could be explained through a number of mechanisms. These included allowing parents to be involved with initial programme activities and the timely inclusion of mini competitions. These mechanisms required important contexts such as coaches that were able to cope with the rapid changes in the physical abilities of the participants and having a programme that was developed with the 'family' in mind (Daniels, 2016).

Keywords: *youth development, disability sports programme*

**THE EFFECT OF ENDURANCE SPORTS ON MATERNAL FERTILITY AND FETAL DEVELOPMENT**

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Every women training for and performing in endurance sport events such as the Ironman Distance Triathlon (3,8 km swim; 180 km bike; 42,2 km run) eventually considers the long-term effects on her fertility and the developing fetus. A systematic review of the literature shows that the nutrition status before and during pregnancy and her body composition have a profound effect on placental function, which is the main source of nutrients for the fetus. By measuring the activity of the placental A amino-acid transporter, we can study how different lifestyles affect the placental function. The results show that women with a higher circumference of the upper arm, which relates with muscular mass, have a higher activity of this transporter, meaning that the fetus is supplied better with nutrients. The background physiology shows that the skeletal muscles produce and secrete an endocrine factor which serves as a signal to the placenta. Higher concentrations of this endocrine factor cause the placenta to transfer more nutrients to the fetus since the body is presumed to be in good, not starving, condition. It was also shown that a critical period for stopping the endurance exercise, though moderate exercise is still advised, is at least 3 months before pregnancy. Therefore, it is worth taking care of whole body fitness, but be cautious about when to stop performing long distance competitions and trainings.

*Keywords: endurance sports, fetal development, maternal fertility*

## RELATIONS BETWEEN BODY COMPOSITION AND SKELETAL DEFORMITIES OF YOUNG KIDS

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Aim of the study was to determine relationship between the obesity indicators and postural status including shoulder obliquity (ShOb - degrees), pelvic rotation (PeRO - degrees) shoulder displacement (ShDi - cm) and Varus/Valgus left and Varus/Valgus right (V/VI and V/Vr in degrees) manifestations. This cross - sectional approach was intended to determine and quantify appearance of postural deformities. Measurement was conducted using portable measuring devisees (Contemplas 3D animation tool with high speed cameras and Tanita - body composition scale using BIA). Assessment of primary school male and female subjects was done in 12 different schools. In overall, study included 530 subjects with female share of 257 (age:  $10.1 \pm 1.6$  years; height:  $136.9 \pm 13.8$  cm; weight:  $33.8 \pm 9.8$  kg) male counting 273 individuals (age:  $9.7 \pm 1.8$  years; height:  $134.7 \pm 11.1$  cm; weight:  $32.7 \pm 9.9$  kg). Body composition assessment and scaling was done prior to postural status testing, using standardized procedures. Variables outputted from testing were body weight (BW), body fat percentage (BF%), body fat mass (BFkg), body mass index (BMI) and muscle mass percentage (MM%). Relation was determined using Spearman's correlation coefficient with alpha level of 0.05. For male participants results showed low but significant correlation between V/VI and body mass ( $r_s=0.22$ ;  $p<0.001$ ), while among girls small negative relationship was noted with muscle mass percentage ( $r_s=-0.26$ ;  $p<0.001$ ). V/Vr correlated with body mass ( $r_s=0.27$ ;  $p<0.001$ ), fat mass in kg ( $r_s=0.3$ ;  $p<0.001$ ), body mass index ( $r_s=0.3$ ;  $p<0.001$ ) and percentage of muscle mass ( $r_s=-0.24$ ;  $p<0.001$ ). In females small correlations were observed between BM ( $r_s=0.24$ ;  $p<0.001$ ), FMkg ( $r_s=0.3$ ;  $p<0.001$ ), BF% ( $r_s=0.37$ ;  $p<0.001$ ) and MM% ( $r_s=-0.369$ ;  $p<0.001$ ). Majority of the upper body postural status deformities was insignificantly related to the obesity markers. Notably, judging from the results, "O" and "X" legs deformities were prominent due to increased body weight and excesses of body fat. Since percentage of muscle mass was negatively correlated, one can be concluded that higher percentage of muscles in body can prevent occurrence of leg deformities among children between 8-11 years of age.

**Keywords:** *body posture, body composition, prevention, health*

## **PROBLEM OF PREMATURE COMPETITIVE ORIENTATION**

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Modern era is characterized by the totality of occupation, which means that every activity is trying to completely occupy us and force us to engage only in it. Especially if its purpose is to achieve excellent results, as it is the case in sports. Therefore an early orientation in competition is essential guide for the opportunity of superior success. Competitive performance on one hand socially inhibits or impoverishes peer relations of children and youth and on the other hand, it prevents broader thinking since the latter constitutes an obstacle towards focused and exhausting functioning (casts doubt in the meaning and certainty of excellent achievements). It is namely necessary to consider the fact that also in the focused and intense training, competitive achievement is a subject to drastic selection, which puts a big question mark on the top results. Such behavior causes deviations in personal development and social impoverishment. Indeed there are certain specifics in various sport branches concerning the extent of the impacts and consequences of early orientation, but generally such an orientation is harmful for young people. Possible measures should be sought in the direction of parallel activity (which would make the competitive pyramid obtuse) or in the direction of resocialization (which is in any case necessary but not a sufficient measure). Parallel activity is offered as the only preventive measure since resocialization means repairing the existing damage. In this sense the concept of dual career is an interesting and useful option that requires appropriate and precise specification of measures and contents. In addition to these two measures, it is necessary to consider a special status of professional athletes regardless of the outstanding achievements, as the oriented professional training itself is already a special form of training, useful for other activities and has a high transfer value as well. Part of this status is also an existential question that should be properly regulated on the system level, not least because professional sport orientation is some sort of sacrificial process with great entertaining social, economic, market and political effects. In this context, all those, who in one way or another benefit from the staging of professional sports, should contribute to the funding of existential care of performers in these performances.

The article is using the method of problem identification to analyze the topic for a further discussion.

*Keywords: early orientation, sacrificial process, doubt*

## **EXERCISES PROGRAM OF KID'S ATHLETICS AS A MEANS OF IMPROVEMENT OF MOTOR ABILITIES**

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The training for alpine skiers is difficult to perform in summer months when conditions for skiing has exclusively on glaciers, so coaches and their professional teams look for alternative sports activities, which will similarly burden competitors as well as during the training on skis. A further problem arises in a selection of appropriate alternative sports in the training process of children. From all motor skills, explosive power, coordination, balance, agility and mobility are proven in positive correlation with competition results in alpine skiing. Since the model of LTAD program and Kids' Athletics for children age 9-12 years, is recommended application of multilateral and basic physical training, which would affect on motor skills that are most effectively developed at this age and that are directly related to alpine skiing, a survey was conducted in order to find efficacy of application program's kids athletics in training process of children skiers. Program Kids Athletics is conducted during three months (September, October and November) training process - 12 weeks during which was held three training on a day, in minimum duration of 60 minutes. The sample consisted of 33 male respondents who were divided into two groups - the experimental group comprised 17 boys and a control group which consisted of 16 boys aged 10 to 11 years ( $\pm 6$  months), members of the ski club. After statistical analysis of data, comparative statistics (ANOVA) showed that there is a statistically significant difference in the final measurement between experimental and control groups, in all tests for assessment of motor abilities. On this basis, it can be concluded that the applied program had a positive impact, and that led to improved of balance, agility, and mobility at respondents in the experimental group.

*Keywords: Kids Athletics, skiing, motoric abilities*

## **CORRELATION OF MORPHOLOGICAL COMPONENTS WITH SOME MOTOR ABILITIES OF HIGH SCHOOL YOUTH**

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Aim of our research was to establish correlation of morphological components with selected motor abilities of high school youth. We tested 15 male participants (age  $17.01 \pm 0.8$  years, height  $180.87 \pm 7.0$  cm, weight  $72.9 \pm 9.05$  kg), which are attending a sports class in a Slovenian High school. From morphological variables we measured height with GP (Swiss) anthropometer. Body weight, percentage of skeletal muscle mass and percentage of fat mass was measured by bioelectrical impedance Inbody 720. From motor abilities we tested explosive leg strength with squat jump, counter movement jump and counter movement jump with arm swing. We also tested agility with T test which was conducted in both left and right direction. Also the anaerobic power of participants was measured with the 30s Wingate test conducted on the Monark 894e ergometer. For the acquired data the descriptive statistic and the correlation between motor abilities and morphological characteristics was assessed with Pearson's correlation coefficient. The data can be used to compare the relationship of physical and motor abilities between sport and traditional teaching programs in Slovenian high schools.

*Keywords: sports class, morphological variables, motor abilities, correlation*



## THE IMPORTANCE OF MONITORING AND MAINTAINING DATA IN SPORTS TRAINING PROCESS

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Sports training process involves generation of huge amount of data by various sports sensors. Heart rate monitors, GPS, step counters, velocity meters, cadence meters and power meters are just some of them. Collected data, if carefully interpreted, offers outstanding insight in athlete's performance. Trainee's abilities, fatigue and efficiency of every training can be recognized by trainers and optimal training can be predicted based on the readings. In the past few years, many computational methods were developed in order to automatically analyze sport training data. Those methods incorporate recent approaches from data mining and computational intelligence. Moreover, they offer an automatic training planning, athlete's habits discovery and food adaptation according to training plan. On the other hand, storing data during the athlete's career would provide many statistical comparisons among various generations, athletes or teams. Actually, it would be educational to know the training plan of marathoners, who lived hundred years ago. Therefore, we would like to show the importance of monitoring, maintaining and storing data in this presentation. We would like to discuss about the simple and efficient ways of maintaining data and show how the sport activity datasets are created. After all, datasets could be distributed via the Internet for research purposes and along with this, we would like present the analysis of some recently released examples of datasets.

*Keywords: Data mining, dataset, sport activity, sport training*

**RELATIONSHIP BETWEEN BODY SCHEME ACQUISITION AND DEVELOPMENT OF DRAWING  
IN EARLY CHILDHOOD EDUCATION: A CASE STUDY**

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University of Alicante

The purpose of the study is to analyze the relationship between body scheme acquisition in children of Early Childhood Education (5 years) and the evolution of the drawing. The study involved a total of 44 boys and girls from a school, as well as 12 kindergarten teachers with experience, all in the province of Alicante. The instruments used, based on PREFIT battery, were an anthropometric assessment, measurement of handgrip strength test by TKK and the standing long jump test. In addition, the Human Figure Drawing Test and a variation using colors and other elements. To complement the research, semi-structured interviews were conducted by teachers, a questionnaire on eating habits and a sociodemographic questionnaire for parents. The data analysis techniques include descriptive statistics, t of Student for independent samples and the correlation coefficient Pearson. The results can induce the existence of positive relationship between body image development and evolution of the drawing.

*Keywords: body scheme, Human Figure Drawing test, Early Childhood Education*

## **EMG COMPARISON OF TIBIAL MUSCLES DURING PLANTAR FLEXION AT EXTENDED AND FLEXED KNEE**

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EMG signal indicates muscle activity. To determine muscle activity level at various motor tasks, or to compare activation of different muscles and different participants, the EGM signal must be normalised. One of the most common methods is to normalize EMG signals to those associated with a maximal voluntary isometric contraction (MVIC) (Burden, 2010). Therefore, it is necessary to choose a movement that allows the measured muscle to activate to its maximum. The purpose of this study was to compare the value of EGM signal during plantar flexion at extended and flexed knee. 14 people participated in this study ( $25,6 \pm 3,6$  let,  $178,0 \pm 8,8$  cm,  $72,9 \pm 12,9$  kg), on which we measured MVIC with ankle extension when the knee was extended or flexed ( $90^\circ$  angle). Every participant performed two MVIC. We analysed the average value of EMG from those MVIC for muscles TA, PL, PB, GM, GL in SOL by SENIAM recommendation. To compare the results, we used Paired Samples t-test. During plantar flexion, muscles TA and GM were more activated when knee was extended (TAflex  $0,003 \pm 0,01$  mV, TAext  $0,032 \pm 0,048$  mV; GMflex  $0,134 \pm 0,165$  mV, GMext  $0,246 \pm 0,199$ ;  $p \leq 0.05$ ). There were no other statistical significant differences with other muscles. To normalize EGM signal for muscle GM, it is, by MVIC method, better to use the measurement with extended rather than flexed knee, which also reported by Hébert-Losier (2013). Higher TA activity in plantar flexion with extended knee shows an increased co-activation of plantar and dorsal flexors with extended knee. However, this is normal from EMG signal normalisations standpoint because at plantar flexion, TA muscle is far less active than at dorsal flexion, which is the basic task when it comes to measuring the highest EGM signal of TA muscle.

*Keywords: muscle activity, plantar flexion, knee*

## VALIDITY OF A SUBMAXIMAL CYCLE ERGOMETER TEST IN CHILDREN

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The Ekblom Bak-test is a submaximal cycling test for estimation of VO<sub>2</sub>max. The test has been developed and tested in adults. The purpose of the present study was to assess the validity and reliability for the EB-test in children and to identify any maturity-related factors for prediction errors. Subjects were 50 healthy, well trained boys and girls, 10-15 years old. All children underwent a medical examination, including visual assessment of pubertal maturity. All included participants were in Tanner stages 1-4. The physical tests were an EB-test and an incremental treadmill running test for direct measurement of maximal oxygen uptake (VO<sub>2</sub>max). Group mean difference, correlation coefficient (*r*) between individual estimated and measured values, as well as standard error of estimate (SEE) were applied to assess validity. The mean difference between estimated and measured VO<sub>2</sub>max was 0.09 L/min, *r* = 0.86 and SEE 0.29 L/min. Sex and maturity status, as well as the variable  $\Delta$ Heart Rate/ $\Delta$ Power Output ( $\Delta$ HR/ $\Delta$ PO) in the prediction equation, were significant predictors for the estimation error. The largest overestimation was seen in pre-pubertal boys (0.49 L/min). The precision of the EB-test was enhanced when the data from boys in Tanner stage 1 and 2 were re-calculated using the prediction equation developed for women (mean difference -0.05 L/min, *r* = 0.92 and SEE 0.23 L/min in the entire sample). Prediction error decreased in boys, but not in girls, with increasing pubertal maturity. The test-retest resulted in a mean difference of -0.08 L/min, *r* = 0.87 and SEE 0.28 L/min. Coefficient of variation (CV) was 3.1%. In conclusion, the EB-test is a valid and reliable test in most children. The validity is however related to sex and pubertal maturity status.

*Keywords: aerobic testing, fitness, children, maturity, maximal oxygen uptake.*

**THE INFLUENCE OF DIFFERENT AEROBIC MEASURES, SKELETAL MATURATION, BODY SIZE AND COMPOSITION ON REPEATED SPRINTS ABILITY (RSA) IN YOUTH SOCCER PLAYERS**

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The aim of the present study was to determine the contribution of different aerobic measures, skeletal maturation, and body size and composition to the inter-individual variations on repeated sprints ability (RSA) in youth soccer players. Seventeen under-15 soccer players (age:  $14.6 \pm 0.5$  years) were recruited from a soccer professional team to take part of this study. Body size and skeletal age (Fels method) were determined for all players. Body composition was predicted from skinfolds (week 1). The Carminatti Test (T-CAR) was used to assess intermittent endurance running capacity (given by peak velocity derived from T-CAR [PVT-CAR]) and a repeated sprint protocol (RSA - 6 x 20+20 m) to assess the best time (RSAbest) and mean time (RSAMEAN) (week 2). An incremental maximal test on a treadmill was performed to determine both the peak oxygen uptake ( $VO_{2peak}$ ) and speed associated to  $VO_{2peak}$  ( $sVO_{2peak}$ ) (week 3). Pearson correlation and multiple linear regression analysis were used to examine the independent effects of aerobic measures, maturity, body size and composition on RSA performance outcomes. Skeletal age and PVT-CAR were significantly associated with RSAbest ( $r=0.63$  and  $0.51$ ;  $p<0.05$ ) and RSAMEAN ( $r= 0.61$  e  $0.52$ ;  $p<0.05$ ), respectively. Furthermore, body mass and  $sVO_{2peak}$  were identified as positive predictors while stature and adiposity were negatively associated with RSA performance outcomes. These independent variables accounted for 88.5% and 90.0% of the inter-individual variance in RSAbest and RSAMEAN, respectively. In conclusion, skeletal maturation, body size, fatness and aerobic fitness had an independent effect on repeated sprint ability in youth soccer players.

*Keywords: skeletal age, young athletes, field testing, intermittent exercise*

## **EFFECT OF ACTIVE REST BETWEEN SETS ON THE PLYOMETRIC TRAINING FOR FOOTBALL PLAYERS**

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The plyometric training presents a popular method of physical training which improves the explosiveness and power of an athlete. Plyometric training has taken effect in various sports such as football where vertical jumps, explosive movements and kicking the ball is a must. Long rest periods are required between the sets of plyometric training which is very time consuming. The aim of our study was to check whether the implementation of football specific technique drills with the ball in the rest period would affect the plyometric training with respect to passive rest. Twelve football players (age 22,1 +/- 2,2 year; body mass 76,4 +/- 4,5 kg; height 178,4 +/- 4,5 cm) visited the laboratory twice and performed five sets (starting the set every five minutes) of nine consecutive drop jumps. In one visit the rest was passive and on the other three repetitions of football specific short duration polygon were performed during rest. All jumps were performed on the force plate (Kistler, Switzerland). The average of first, middle and last three jumps were compared using RMANOVA. The results showed no statistical differences among the heights of the jumps ( $p=0.06$ ,  $p=0.304$  and  $p=0.341$ ) for first, middle and last three jumps respectively. However, slight tendency towards the higher results of the jumps executed during passive rest was observed. Therefore we surmised that short time specific ball drills do not influence the plyometric training, however we must assure that the intensity of the intermediate activity is not too high.

*Keywords: Plyometric training, football, power, conditioning*

**ILLICIT DRUGS AND OTHERS SUBSTANCES USED BY YOUNG ATHLETES BETWEEN AGES OF 10 AND 25**

**Gabrovec, B.**

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The purpose of this study was to establish the abuse of illicit and other substances among young recreational athletes according to the type of sport, training frequency, etc. The study examined young and active athletes from Slovenia between the ages of 10 and 25 that are actively engaged in any sports activity at least twice per week. The survey was undertaken by 1,780 respondents, who provided 1,095 of appropriately filled out questionnaires (61.51%). The total number of respondents included 575 (52.5%) men and 520 (47.5%) women. 31.5% of respondents tried smoking or smoked cigarettes at least once in their life; whereas, 4.6% respondents reported smoking on a daily basis. Most of the respondents reported to have tried alcohol (67.5%), of which 21.5% tried alcohol in the last month. 19.9% of the respondents tried smoking cannabis, but 9.1% reported that this was a one-time event. 13.6% of the respondents tried stimulants, but 5.9% reported that this was a one-time event. The respondents least often tried heroin (3.1%), cocaine (4.5%), and amphetamines, LSD, new synthetic drugs (3.6%). According to the research young active athletes less often consume some substances compared to the general population and first try aforementioned substances at a higher average age. Research shows that athletes who train more often (4 times per week or more) are less prone to trying or consuming different substances. Research shows that young athletes actively engaged in sports activities less frequently use different types of substances compared to the general population. Provided that athletes have already been exposed to various substances their average age of first encounter with drugs is higher compared to that of a general population.

*Keywords: Nicotine, Alcohol, Cannabis, Illicit drugs, Heroin, Sports.*

## **SUBSTRAT OXIDATION RATES DURING EXERCISE IN TRAINED AND UNTRAINED YOUNG ADULTS**

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The aim of the present study is to examine the differences in maximal fat oxidation rate during acute exercise between trained and untrained young adult men. 50 healthy, trained (age= 20.75±0.31 years, BMI= 21.75±0.34 kg/m<sup>2</sup>, n= 24) and untrained (age= 21.71±0.48 years, BMI= 22.19±0.41 kg/m<sup>2</sup>, n= 26) young men volunteered to participate in this study. After overnight fast, subjects tested on a Monark cycle ergometer and started pedaling at an external power output of 60 W. Subjects' pedaling cadence was kept at 60 revolutions/min (rpm). Every 3,5 min, the power output was increased by 35 W until exhaustion. Maximal oxygen uptake and maximal fat oxidation rate were determined with indirect calorimetry by using an incremental exercise test on cycle. All participants were tested same time interval to minimize the effects of diurnal biological variation. An unpaired Student's t-test was used to determine the differences between the groups. Oxygen uptake, respiratory exchange ratio, heart rate, relative contribution of fat and carbohydrate to energy expenditure at exercise intensity that elicits maximal fat oxidation (Fatmax) were significantly different between trained and untrained subjects (p<0.05). Maximal fat oxidation rate was significantly higher in trained group than untrained group (p<0.05). On the other hand, carbohydrate oxidation rate and percent of VO<sub>2</sub>max at Fatmax were similar (p>0.05). The study results suggest that the trained individuals also have higher maximal oxygen uptake and fat oxidation rate than untrained young adults. Also, it can be said that the relative contribution of fat and carbohydrate to energy expenditure at Fatmax were affected training status in young adults.

*Keywords: Fat oxidation rate, Acute exercise, Training*



**THE EFFECTS OF 2-WEEK HIGH INTENSITY INTERVAL TRAINING ON FAT OXIDATION RATE DURING SUBMAXIMAL EXERCISE**

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The objective of this study is to investigate the effects of low volume high intensity interval training (HIIT) program on substrate oxidation during submaximal exercise in recreationally active women. Sixteen young women (n=8 training; n=8 controls) voluntarily participated in this study. The training group completed two weeks of HIIT (10 session), including 2 WATs in every training sessions. Before and after the training, the subjects warmed up at 0 W 60 revs min<sup>-1</sup> for 3 min. After the warm up, the test began at 50 W, 60 revs min<sup>-1</sup>. The workload was increased 30 W every 3.5 min until exhaustion, when the subjects could no longer maintain the imposed pedaling rate despite verbal encouragements. The average of the last 2 min of each stage's respiratory gas measurements was analyzed with the fat oxidation rate. 3 days after the first test, subjects cycled the submaximal exercise load at the individual Fatmax intensity which measured during incremental exercise during 45 min (The constant cycle load as W measured maximal fat oxidation rate). There was similar fat oxidation rate in both groups before training. Also, after the training any significant change was not any significant change after the training ( $p>0.05$ ). These results demonstrated that a 2-week HIIT did not change maximal fat oxidation rate during submaximal exercise in young women.

*Keywords: high intensity interval training, fat oxidation, submaximal exercise*

## **THE EFFECTS OF AEROBIC EXERCISE ON CORTISOL, INSULINE AND GLUCAGON HORMONE LEVELS OF ELITE ATHLETES**

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Exercise may cause some changes in some hormone levels of all athletes. In this study, the effects of aerobic exercise on cortisol, insulin and glucagon levels of elite athletes levels were examined. Totally 20 male sportmen (10 cyclists, 10 wrestlers) 19-24 years of age with 2 different branches has participated to this study as volunteers. The research was held in the Selçuk University 75th Gymnasium of School of Physical Education and Sports. By using 20 meter shuttle run cassette that recorded in a cassette according to a specific protocol ,the blood samples were taken from their forearm vein elbows before making the 20 meter shuttle run test and immediately after then to the 2 separate groups consisting of athletes in different branches and Hormone levels were measured from these samples indicated. The study protocol was approved by the ethics committee of Selçuk University of Physical Education and Sports School by the ethics committee. In the study, Before and after aerobic exercise bike branch of athletes in wrestling and in the study of cortisol, insulin and glucagon levels average in comparison. It was used Wilcoxon Test which tests the significance of the difference between that reference test scores of two different sets of measurements and Mann Whitney U Test which tests the significance of the difference in the two independent groups. The average age is  $21.75 \pm 1.91$  year, height  $176.95 \pm 5.36$  cm and weight  $74.15 \pm 11.21$  kg of the athletes. While they were resting, cortisol levels average was  $7.72 \pm 1.48$   $\mu\text{g}/\text{dl}$  and after the aerobic exercise it increased to  $10.05 \pm 2.06$   $\mu\text{g}/\text{dl}$  ( $p < 0.05$ ) their insulin levels was  $14.07 \pm 5.84$  Rest u / ml and after it decreased to  $8.03 \pm 2.53$  U / ml ( $p < 0.05$ ), The average of their glucagon levels was  $94.28 \pm 12.74$  ng / L and after it was increased to  $112.54 \pm 16.74$  ng / L ( $p < 0.05$ ). According to findings obtained from the research; aerobic exercise increased cortisol and glucagon levels, and on the other hand it decreased insulin levels in both wrestlers and cyclists. The results of the study will facilitate to determine the best method related aerobic exercises on the elite athletes

*Keywords: Aerobic exercise; Cortisol; Elite athletes; Glucagon; Insulin*

## COMPARISON OF EVERTOR MUSCLE ACTIVITY BETWEEN FOOT EVERSION AND EXTERNAL ROTATION

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EMG signal is an indicator of muscle electric activity during contraction. For comparison of EMG signal between individuals and different tasks is necessary to normalize EMG signal. Maximum EMG signal obtained with maximal voluntary isometric contraction can be used for normalisation. In our study we compared foot eversion and external rotation, because it is hard for a participant to perform correct isometric contraction, as there is no visual feedback. The aim of this study was to determine during which isometric contraction (foot eversion or external rotation) there is higher muscle electric activity of PB and PL and so to choose the better ankle move for EMG signal normalisation. Sixteen subjects participated in this study (8 women and 10 men) with average age of  $26.8 \pm 5.6$  years, height  $177.2 \pm 8.2$  cm and weight  $73 \pm 13.1$  kg. EMG electrodes were placed on muscles according to SENIAM recommendations (Hermens *et al.*, 2000). We measured two maximum voluntary contractions in isometric strength-testing device, which is designed for external rotation and two maximum voluntary contractions in isometric strength-testing device, which is designed for foot eversion. Data was analyzed with Labchart 7 (AD Instruments, New Zealand). EMG signals were filtered (500Hz/20Hz), absolute value of signal was used and smoothed. EMG signal was measured in the range of one second during contraction and taken average value. Statistic data processing was made in SPSS with paired-samples T-test. There were no statistically significant differences between contractions in any muscle (average value for PB in eversion was  $0.304 \pm 0.193$  and in external rotation was  $0.337 \pm 0.196$ ; average value for PL in eversion was  $0.174 \pm 0.189$  and in external rotation was  $0.159 \pm 0.234$ ). Some of the subjects had higher EMG muscle signal (PB or PL) during external rotation and some during foot eversion. It makes no difference which contraction we use for EMG normalisation, but perhaps it is wise to use both.

Keywords: *emg, eversion, external rotation, evertors*

## **KINEMATICS OF THE SNATCH IN ELITE MALE WEIGHTLIFTERS**

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The purpose of the study was to analyze the kinematical differences between the first and the second pull of the snatch technique in elite male weightlifters. The heaviest successful snatch lifts of seven male weightlifters who won gold medals were analyzed at the 2010 Men's World Weightlifting Championship. The snatch lifts were recorded using 2 S-VHS cameras (50 fields/s), and points on the body and the barbell were manually digitized using the Ariel Performance Analysis System. The results revealed that the maximum vertical velocity of the barbell was significantly greater during the second pull than in the first pull ( $p < 0.05$ ). The mechanical work performed in the first pull was greater than the second pull, and the power output during the second pull was greater than that of the first pull ( $p < 0.05$ ). As a result, coaches pay attention to training techniques that develop maximum strength for greater mechanical work during the first pull and increase the explosive strength of the extensor muscles about the hip, knee, and ankle joints during the second pull.

*Keywords: weightlifters, snatch technique*

**GENERIC MULTIDIMENSIONAL MODEL FOR RUNNING VELOCITY ASSESSMENT SCORE (RVAS): FOOTBALL TALENT SELECTION APPROACH**

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A modern approach to create an elite athletes involves a multi-year period of systematic training. In order to be able to control this long period as a process, we need to develop reliable methods of evaluating the performance and physical fitness of athletes in relation to the critical age periods and important training phases. Current training approach involves the application of the multidimensional assessment model method (1). The aim of this research is to define a generic multidimensional model for assessing the maximal short running speed fitness level of pre-puberty young male football players. The sample consist of young male football players (N=264; Ages=8.9±1.0 yrs; training experience=2.4±1.2 yrs.). They were tested by a battery of 5 single tests: the 10m, 20m and 30m maximum running test, and the 20m zig-zag test without (20mZZ) and with a ball (20mZZB). Multidimensional scores were calculated as described before (1, 2). A multiple regression analysis has been used, with the individual score of the examinees representing a criterial, and the results of particular test a predictive variable (2). The results of descriptive statistics showed that the main values for variables were: 10m, 20m and 30m – 2.28±0.18, 3.52±0.30 and 5.81±0.44 sec., and for 20m ZZ and ZZB – 6.37±0.49 and 9.04±1.50 sec, respectively. A defined multidimensional model for RVAS explained the 100% of criteria variability (Adj. R2 = 1.00) at statistically significant level–ANOVA F=1.802E9, p=0.000, with SEE at 0.003 score number. The equation of the defined generic model had the following form:  $RVAS=272.652-(10m \cdot 19.425)-(20m \cdot 14.035)-(30m \cdot 9.891)-(20mZZ \cdot 7.725)-20mZZB \cdot 2.479$ . As the training process in football aims, in one way, to improve the maximal running velocity, the defined RVAS model should be a useful tool for coaches to objectively control the applied training process and to assess the fitness level of young football players, as a one of the criteria in the selection.

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Keywords: *football, sprint running, model, selection*

**IS JUNIOR SUCCESS A GOOD PREDICTOR OF SENIOR SUCCESS? A CASE STUDY OF COMBAT SPORTS.**

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Most countries attempt to develop systematic structures to identify sport talents and to promote the international success in certain sports. Despite the uncertainty of the relationship between junior and senior performances, national sport organizations still tend to use junior performance as a predictor for later success. The aim of this study is to explore to what extent junior success is a reliable criterion to predict senior success. In this study we analyze athletes' performances in three combat sports: wrestling (n=3452), taekwondo (n=2789), boxing (n=2568). Data contain the results from junior (World and European championships) and senior competitions (European and World championships, Olympic Games) from 2006 to 2016. First, descriptive analysis was conducted to provide the percentage of junior participants who finally won medals in senior competitions. Second, discriminant analysis and artificial neural network were conducted to predict the possibility of winning senior medals based on junior performances. Descriptive analysis revealed that 3.7% (boxing), 22.26% (taekwondo), and 21.8% (wrestling) of all the junior participants that had won senior medals. Moreover, the discriminant analysis showed that only 5% in boxing, 4% in taekwondo, and 27.4% in wrestling could be predicted to win senior medals based on their junior performances. However, artificial neural network (i.e. multilayer perception) showed that 0-5% in boxing, 0 - 24% in taekwondo, 39.6 - 48.1% in wrestling could be predicted to win senior medals based on junior performance. Predicting senior medals only by using junior results is difficult. The discriminant analysis provides an accurate prediction for 90% of the athletes. It shows that it is easier to predict the number of athletes that will not win a medal than those who will win a medal. Secondly, there are differences among the three combat sports, in which wrestling shows greater chance to win senior medals if they won junior medals.

*Keywords: combat sports, junior performance, prediction*

**ARE THE COACHES' NEEDS IN LINE WITH THE PERFORMANCE CHARACTERISTICS  
DIFFERENTIATING JUNIOR ELITE BASKETBALL, SOCCER AND VOLLEYBALL PLAYERS?**

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The Flemish Sports compass is an instrument that allows the orientation of children to group of sports that match their personal characteristics. This study investigated whether two modules of the Flemish Sports Compass are equally beneficial for talent orientation. First, a coach's survey i.e. the "I Need-module" was conducted to analyse the coaches perceived needs for three team sports (n= 27 items). 136 Coaches in three sports, basketball (n=26), soccer (n=71) and volleyball (n=39) participated in this study. Second, a sample of 67 young elite male athletes U18 ( $16.1 \pm 0.8$  years) post age at peak height velocity (PHV; maturity offset =  $2.7 \pm 0.9$  years) were assessed using a generic test battery i.e. the "I Do-module" that identifies to what extent they have the capacity to perform well in a given sport. The participants competed at an international level in basketball (n=27); soccer (n=20); volleyball (n=20). The aim of the study was to investigate the discriminative power from the survey and the generic test battery. The first discriminant analysis (I Need) used the team sports as grouping variables and the coaches' perceived performance characteristics as independent variables. 97.8% were correctly classified (cross-validation 94.1%; F1 (rCan = .925; Wilk's  $\lambda$  = .047;  $p < .001$ ; df = 40). Second the discriminant analysis (I Do) using the team sports as grouping variables and 19 performance characteristics as independent variables resulted in a 98.5% correct classification rate (cross-validation 91.0%; F1 (rCan = .943; Wilk's  $\lambda$  = .030;  $p < .001$ ; df = 38). The results demonstrate that the 'I need-module' can be seen as a golden standard for the generic tests of the Flemish Sports Compass 'I Do-module'. It was shown that it is possible to discriminate basketball, soccer and volleyball. The results highlight the specific demands and at the same time they stress the similarities i.e. abdominal strength; speed and agility; endurance and motor coordination. Sampling these sports at a young age is beneficial for a broad development, since the investigated performance characteristics are specific and generic at the same time.

Keywords: *coaches need, performance, basketball, soccer, voleyball*

**HAND GRIP MUSCLE FORCE CHARACTERISTICS IN A FUNCTION OF YOUNG KARATE ATHLETE'S PHYSICAL FITNESS CONTROL AND SYSTEM OF PRE-SELECTION**

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The hand grip test is simple and reliable physical fitness test which has been used to evaluate contractile characteristics of hand muscles (1). It was established that children and adolescents hand grip force could be used for following biological development and total body strength evaluation (3). Modern karate is one of the most popular martial sports (2), which will be implemented on Olympic Games in Tokyo 2020. Main characteristic of karate techniques are fast, explosive movements with priority on controlled force realisation in regard to opponents. Primary aim of this study was to determine difference between contractile characteristics of hand muscle flexor of at different age's karate athletes in regard to National and Club level. Secondary aim was to define trend of changes in measured contractile characteristics of hand in order to selection process. Sample consisted of two karate athletes groups (National N=46 and Club N=48), divided into three age groups (10-12, 13-14, 15-16 years). Participants were tested by standardized hand grip test with the method of tensiometric dynamometry. Characteristics of maximal (Fmax) and the maximal explosive (RFDmax) hand grip force of the dominant and non-dominant hand were measured. ANOVA and linear regression analysis was used to define differences and trends changes between the groups. Results showed no statistically significant differences on general level (Wilks' Lambda=0.902, p=0.060, Eta<sup>2</sup>=0.050) between National and Club level athletes, but also that the base of statistically significant difference on partial level is the variable Fmax (F=7.626, p=0.007, Eta<sup>2</sup>=0.080). The difference was found between athletes aged 15-16, where Club level athletes had significantly higher Fmax (t=1.963, p=0.034). Results of the trend change analysis have shown that Club level athletes have a greater Fmax increase in a function of age groups for 28.33%. As for the RFDmax, the National level athletes have a greater increase for 20.45%.

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Keywords: *hand grip, muscle force, karate, fitness control*



## **GUIDANCE OF TALENTED YOUTH INDIVIDUALS INTO ATHLETICS**

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The purpose of the research was to determine the physical abilities and anthropometrical characteristics of young track and field athletes in Slovenia. The correlation between anthropometrical characteristics and physical abilities allowing more objectively planning and execution of athletic training within different age categories of children. Collaboration between Athletics Federation of Slovenia and Faculty of sport from Ljubljana led to measurements of young athletes in 2015. The sample consisted of 282 young athletes (175 female and 107 male), which were divided into five different age categories (u10, u12, u14 & u16). All of them were engaged in the organizing training process within one of the specific Slovene athletic sport clubs. We divided study in two parts namely into verification of anthropometric characteristics (set of 13 measurements) and verification of physical abilities with different motor tests as it is: long jump; triple jump; tapping with the hand and leg (both side separately); t-test; vertical jumps above the five barriers; trunk elevation; chin up; forward bend; heavy ball throw; counter movement jump (CMJ); 60m run. The results were evaluated with the help of descriptive statistics. They showed some correlations between different anthropometrical characteristics and tests of motor abilities among young athletes of different age and gender. Based on the results of study is possible to design the criteria for specific motor ability test considering the different gender and age category. Study might have large contribution to practice and for coaches, where the result can led to better professional occupation with the talented young track and field athletes.

*Keywords: young athletes, anthropometrical characteristics, physical abilities, correlation*

**PRESCHOOL NON-SWIMMERS CAN SWIM BREASTSTROKE LONGER WITH THE SUBMERGED FACE THAN WITH THE HEAD ABOVE THE WATER**

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Considering the breathing, the easiest way to swim breaststroke is with the head above the water. Indeed, this rudimentary stroke is often the first attempt of beginners' swimming. However, it could be questionable if it is an appropriate swimming form for non-swimmers in relation to the breaststroke with the face submerged. Indeed, different head positions during breaststroke have different biomechanical effect via body position and buoyancy on non-swimmers' swimming. Therefore, the purpose of the study was to quantify the differences in abilities of non-swimmers to swim the breaststroke with the head above the water or with the face submerged. The latter was enabled by wearing a mask and breathing through a snorkel. For presented purpose, the swimming of the 13 preschool non-swimmers (8 boys, 5 girls, ages 6 years  $\pm$  8 months, height 120  $\pm$  6 cm, weight 24  $\pm$  5 kg) was evaluated. The participants were asked to swim breaststroke as long as possible in two different conditions. Each swim trial was filmed for subsequent analyses of the stroke rate. The participants were able to swim the breaststroke significantly longer with the face submerged (73  $\pm$  37 seconds) than with the head held above the water (42  $\pm$  32 seconds) ( $p < 0.01$ ). Additionally, there were significant differences in stroke rate between swim trials ( $p < 0.01$ ). Considering the obtained results, it could be concluded, that the face being submerged enabled participants easier breaststroke swimming in comparison with holding the head above the water. Furthermore, we suggest to reverse the usual order of learning swimming skills in the case of the use of the mask and the snorkel when teaching non-swimmers. However, the efficiency of such a program should be assessed in further studies.

*Keywords: Swimming beginners; learning; head position; body position*

**THE EFFECT OF THE USE OF MASK AND SNORKEL DURING SWIM LEARNING PROGRAMME FOR PRESCHOOL NON-SWIMMERS**

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A mask and a snorkel are frequently used swim aids in modern learn-to-swim programmes. They enable pupils an easier way to put their head under the water, to see and breathe easier during swimming. The aim of the study was to determine the effect of the use of mask and snorkel during learn-to-swim programme on swimming knowledge and skills of preschool non-swimmers. 39 children participated in the study (ages as 5.5 so 7.8, height as 110.5 so 130.5, weight as 16 so 27). They were divided into matched pairs based on their swimming knowledge and skills shown at initial testing. Subsequently, they were assigned randomly to an experimental or a control group. Both groups completed similar learn-to-swim programmes for non-swimmers by using a mask and snorkel (the experiential group) or without it (the control group). The programme was carried out in a 25-metre long swimming pool with deep water only (water and air temperature 32°C and 28 °C, respectively) in 16 hours (2 hours per day in 8 days). Water adaptation test and tests of swimming knowledge and skills were done before and after the programme. Both groups showed an improvement in swimming knowledge due to the learn-to-swim programme. However, there was only one significant difference in the skills tested between the experimental and the control group after the programme. There were more participants in the control group who were able to perform relaxed exhalation in water than in the experimental group. Considering the results, it could be concluded that the swim teacher should focus on teaching the non-swimmers to open their eyes under the water and teach them exhalation in the water after the use of mask and snorkel. This requires additional time and thus prolongs the program. It seems that due to the participation of preschool children and deep water conditions, the programme which was used in the present study was too short for these adaptations. It is our conclusion, however, that the use of mask and snorkel is useful for teaching non-swimmers the horizontal body position with submerged head, which is an essential skill for a non-swimmer to obtain before learning an effective basic swimming technique.

*Keywords: adjustment to the water, breaststroke, mask, snorkel, preschool children, learning programme*

**MOTIVATIONAL IMPACT OF INCLUSION IN SPORT OF PEOPLE WITH DISABILITIES IN THE CASE OF A SWIMMER**

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The research presents a case study, aimed to determine the motivational effects in a swimmer with spastic cerebral palsy when replacing competitive systems in swimming from the normal system of competitions to the system of people with disabilities. With age and due to growing demands of a modern competitive sport and a system that has increasingly emphasized swimmer's disabilities the results were consequently showed as the reduction of her self-image, stress in competitions and training session, and consequently lack of motivation to do sport, which is significant for her health. When including children and young people with disabilities in competitive sport, we are often faced with critical situations in which parents, children and all those involved in the process of integration into the society endeavour to nullify or reduce an individual's deficit characteristics, which is why every successful integration in the sport of persons with disabilities requires a multidisciplinary approach, with a coach's comprehensive treatment of an athlete, the support of a sports psychologist, a doctor and a physiotherapist, and most importantly the support of the family. The result of the integration in sport of people with disabilities is a highly motivated athlete who competes in a system that is suitable for her capabilities, and which enables her to continue to build her personality, which will help her be successful also in other areas of her life.

*Keywords: swimming, cerebral palsy, motivation, personality, coach*

**HYDRATION LEVEL OF SWIMMERS DURING TRAINING SESSION A LOAD MICROCYCLE.**

**Rezende, M., Cipriano, S., Nunes A., Rosado, F., Massart, A., Rama, L.**

To analyze during training session of a microcycle intensity and high volumes, the impact on post-workout hydration status the four swimmers. Four national and international level swimmers, a female, age 16.5years; body mass of 60.1kg and height to 162cm and three males aged (MD=18.06 years,SD=±1,67); body mass (MD=64,26kg,SD=±9,79) and height (MD=177.9cm,SD=±5,35) underwent one marker evaluation protocol of hydration status during a training microcycle with intensity. BM was measured before and after each training sessions and monitored the intake of liquid, pre urine samples were collected and post training sessions to check osmolarity, density and color. Capillary blood sample was taken for analysis of hemoglobin and hematocrit allowing calculating the change in plasma volume. Each athlete hydration patterns were different during the training sessions, none showed significant losses differences in the percentage of body mass (MD=0.69%,SD=0,28), but the reference values of osmolality of urine females (MD=842.50mOsm/kgH<sub>2</sub>O,SD=183,51) and a 1 male (MD=613.75mOsmol/kgH<sub>2</sub>O,SD=93,31) showed values dehydration, the other two subjects were shown to be hydrated (MD=465.65mOsmol/kgH<sub>2</sub>O). When observed plasma volume to a decrease in female as well as decrease in the subject 1, the other two had an increased plasma volume. The color of the urine, all subjects showed similar patterns of state of hydration, maintaining a slightly hydrated medium. Regarding the density of the urine they were all within the desired values for hydration. Although the change in body weight after training is not high there remains the possibility present insufficient hydration pattern shown by the contents of the plasma volume and the change in osmolality of urine. However, the two athletes with good levels of hydration can be explained by bodyfluid transfer intracellular and extracellular.

Keywords: *swimming, training session, hydration level*

## EVALUATION OF MISTAKES AT THE SWIMMING TECHNIQUES

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Different methods are used to evaluate the swimmer's abilities, swimming skills and knowledge during the swimming learning process. The tests are usually based on the swim distances and/or achieved times for the selected swim distance. However, in some cases this approach could not reflect the progress in the swimmer's swimming technique. Therefore, the main purpose of this study was to evaluate the mistakes that occur at the swimming techniques and to construct a scale for testing swimming knowledge. Sixty two Slovenian swimming coaches were summoned the group of experts in the study. They evaluated 158 mistakes at breaststroke, front crawl and backstroke which most commonly occur at beginners'swimming. The mistakes were grouped according to the elements of the swimming technique, i.e. position of the body, kicking, stroking, head movement, and coordination. A questionnaire based on Thurstone's model was constructed for each swimming technique. The experts evaluated each mistake on a seven–point range scale by its importance and on a three-point range scale by its frequency. Considering the median value, interquartile range values and frequency of each mistake, a scale of the mistakes for each technique was determined. The suggested scale could be used for classification of swimmers by their swimming knowledge. Therefore, it could be a useful tool for swimming teachers and coaches.

*Keywords: swimming, learning, qualitative analysis, evaluation*

**SOCIAL ASPECTS OF VIDEO EXERCISING DURING CLASS BREAKS**

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Many studies have shown that in recent years, sedentary lifestyle is increasing rapidly. The number of children engaged in physical activity decreases. Particularly concerning is that the number of hours of regular and extra-curricular physical education is reducing, despite all of its benefits. The situation in Croatia is serious because there is a possibility that the number of hours will be reduced to 30 hours per year, or 1 hour of physical education a week. A total of 203 students of the elementary school „Pavleka Miškine“ in Zagreb, Croatia, had active breaks on a daily basis. During the intervention period, experimental group participated in a 5-minute group physical activity daily in the middle of a 45-minute academic lesson by imitating video animations projected on the board (Brain Break by HOPSports®). The aim of this research was to investigate the effect of video exercise on children’s attitudes and perception of physical activity, as well as social aspects of video exercising. Based on specific pre-test and post-test for students and teachers we will try to presents benefits children got from a daily group exercise. Results show that the strongest effect was on children’s self-efficacy in using video exercise. There are statistically significant changes on children’s attitudes toward the effect of physical activity (PA) on their health, the benefits associated with PA and perceived support from their parents and teachers. There were also positive changes on children’s perceived importance of PA. With the advent of new and better technologies, there is an increasing preference of students to engage in online games instead of outdoor physical activity. Five-minute exercise program offers teachers a ready tool to facilitate learning by integrating physical activity into academic lessons.

*Keywords: active breaks, children, physical education*

**ARISTOTLE UNIVERSITY OF THESSALONIKI SPORTS CENTRE: STUDENTS' SATISFACTION ABOUT ENROLLMENT IN SPORTS AND RECREATIONAL ACTIVITIES.**

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Aristotle University of Thessaloniki –University Sports Centre.

The purpose of this study was to examine the satisfaction of students about the quality of program services in the Aristotle University of Thessaloniki Sports Center (A.U.Th.S.C.). A total of 194 students (99male, 95 female) completed a questionnaire assessing quality of service and satisfaction about their decision to enroll in A.U.Th.S.C. Sports and recreational activities. Servqua, a questionnaire with 28-items assessing quality of service (Parasuraman et al 1985) adopted to the Greek language based on the Greek adaptation (Alexadris et.al., 2004) and was utilized to asses 5 underlying dimensions of service quality: (a) personnel (7-items), (b) reliability (5-items), (c) perceived outcomes (6-items), (d) facilities (5-items) and (e) responsiveness (5-items). The mean score of responses to 3 different items estimated total satisfaction. The answers were given in a seven-point Likert-type scale (1 = very bad, 7 = excellent). Students scored relatively high on the perceived outcomes (M=6.1), personnel (M=5.5), facilities (M=5.1), responsiveness (M=4.8), reliability (M=5.3), and the total satisfaction was found to be M=5.7. For the present study, internal consistency was confirmed using Cronbach's alpha (.72) and factor analysis confirmed that in the proposed factor structure, for all the items' loadings revealed above .65. A multiple linear regression model was performed to identify those variables of quality of service that could predict satisfaction. The stepwise method of variable selection was used. Results showed that a model including personnel, facilities, and responsiveness as predictor variables provides the best fit to the data explaining almost 21% of the total variance in satisfaction. This prediction was statistically significant as confirmed by the large F value (F=51.48, p<.001). These results are consistent with similar research findings on service quality of sports centers in Greece, and Europe, showing that the main factors of quality services were the facilities and the employees. In conclusion, we believe that University Sports and Recreational programs should invest in human resources training and lifelong education of the staff. Furthermore, they must have the appropriate facilities with the necessary equipment and programs adapted to the students' participation needs and responses.

*Keywords: university students, sports activities, recreational activities, program satisfaction and service quality.*



**GENDER DIFFERENCES IN THE LIFESTYLE COMPONENTS AMONG STUDENTS AT THE FACULTY OF SPORT – PILOT STUDY**

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Lifestyle of the future professionals in the field of physical activity is very important for their professional work. The main purpose of this research was to analyze the gender differences among students at the Faculty of sport concerning satisfaction with lifestyle. The research was done in the academic year 2015-16 on the 15% random sample of the students. We used the questionnaire of life style habits (Majerič and Pori, 2015). The data of variables was analyzed with SPSS for Windows. To calculate the gender differences we run t test for independent samples. We found that female students evaluated with the highest satisfaction ratings social component, followed by the environment, physical, employment, emotional, intellectual and spiritual component. Male students evaluated with the highest satisfaction ratings component of the environment, followed by social, physical, emotional, employment, intellectual and spiritual component. We found that gender differences were statistically significant in the social component ( $p < 0.05$ ). Our findings are useful for the closer and wider professional public.

*Keywords: lifestyle, analysis, components, students, gender differences, Faculty of Sport*

**GENDER DIFFERENCES IN EATING HABITS AMONG STUDENTS AT THE FACULTY OF SPORT – PILOT STUDY**

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Healthy eating habits of the future professionals in the field of physical activity are very important for their professional work. The main purpose of this research was to analyze the gender differences among students at the Faculty of sport concerning eating habits. The research was done in the academic year 2015-16 on the 15% random sample of the students. We used the modified questionnaire of eating habits CINDI (Tomsic et al., 2014). The data of variables was analyzed with SPSS for Windows. To calculate the gender differences we run Mann-Whitney's U test. We found that in general, female students were eating healthier food than male students. Female students were more often consuming fresh fruits and vegetables, whole grain bread and unprocessed grains and fish. They were less often drinking soft drinks, coffee and alcohol. Female students were more often preparing food by themselves at home. Male students were more frequently consumed animal milk, cheese, red meat and quickly prepared, fried and canned food. Male students were more often eating in restaurants. We found that gender differences were statistically significant in the consumption of fresh vegetables ( $p < 0.05$ ), animal and vegetable milk ( $p < 0.05$ ), red meat ( $p < 0.001$ ), processed grains ( $p < 0.05$ ), fried foods ( $p < 0.05$ ), coffee ( $p < 0.05$ ) and eating in restaurants ( $p < 0.05$ ). Our findings are useful for the closer and wider professional public.

*Keywords: eating habits, students, gender differences, Faculty of Sport*

**EFFECTS OF MASSAGE ON SELECTIVE PHYSICAL PARAMETERS ON COLLEGIATE ATHLETE**

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The purpose of this presentation is to examine acute effects of massage on flexibility, balance reaction time and jumping ability. A group of 10 male college athlete aged 18-22 years were participated this study. Prior the massage intervention all subjects completed sit and reach test, balance test, reaction time test and vertical jump tests. Effleurage, petrissage, percussion and vibrations movements were applied on lower extremities, back and upper extremities about 40 min. 5 minute rests after massage application same test were performed. Normality of data was determined by Shapiro Wilk and pre-test post test results were compared by paired sample t-test (SPSS 20). Test results indicated that there is a significant increase on sit and reach test ( $p=0.000$ ) and vertical jump mean values( $p=0.017$ ) after massage intervention .There is relatively better test score has found for reaction time and overall balance but this results are not significant. This study shows positive effects of massage on flexibility and vertical jump performance of collegiate athlete. Previous studies found that a single massage of the hamstring muscle group was not associated with any significant increase in sit and reach performance immediately after treatment in physically active young men (Barlow,2004) but on this study massage time was limited with 15 min. On the other hand another study found positive effects of massage (Dursley, 2012) on hamstring flexibility. It is scientific evidence that better flexibility decrease injury risk and enhance performance that's why massage should integrated athletes training program

*Keywords: massage, flexibility, balance reaction time, jumping ability*

## **ATHLETIC IDENTITY OF DISABLED SKIERS**

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Athletic identity is the degree to which an individual identifies with the athlete's role and looks to others for acknowledgement of that role. It is a type of self-schema or how individuals perceive themselves. By participating in a sport, individuals are making a social statement about who they are and how they want others to regard them. Athletic identity is developed through the acquisition of skills, confidence, and social interaction during sport. It plays a part in both the cognitive and social role. The aim of our research was to ascertain differences in athletic identity between two groups of disabled persons. There were thirty disabled persons involved in our study, all had an acquired disability, aged  $37.4 \pm 7.2$ . Half of the participants were actively engaged in sport – alpine skiing, the other half were not active in any sport. We used a questionnaire that consisted of twenty-four statements about athletic identity. The respondents evaluated each of the statements with a scale of 1-5, where 1 means I completely disagree and 5 means I completely agree. In all twenty-four statements there was a statistically significant difference ( $t < 0,05$ ) in favour of the active group. Engaging in disabled sport plays a major role in athletic identity which influences the social identity, subjective quality of life, self-concept, social interactions, process of rehabilitation and physical capacity, such as strength, skills, balance, etc. After we have analyzed all the positive aspects of high athletic identity, we suggest to involve adaptive sports already in the last phase of rehabilitation after an acute injury.

*Keywords: Athletic identity, Alpine skiing, Disability*

## **EFFECTIVENESS OF A MOBILE APPLICATION WITH RESPECT TO ITS PERSONALIZATION AND USE OF MOTIVATIONAL ELEMENTS**

**Kajtna, T.<sup>1</sup>, Cvetković, B.<sup>2</sup>, Janko, V.<sup>2</sup>, Štrumbelj, B.<sup>1</sup>, Štihec, J.<sup>1</sup>, Luštrek, M.<sup>2</sup>**

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School physical education aims to teach essential movement patterns and sports, and to encourage children to be physically active in their leisure time throughout their lives. Unfortunately the physical fitness of Slovenian youth has decreased substantially in the last 20 years. Because of that, the e-Gibalec project developed a mobile application that – in cooperation with physical-education teachers and parents – encourages schoolchildren to be more active and adopt a healthier lifestyle. The application uses smartphone sensors and intelligent computer methods to monitor the children's movement in their leisure time. In addition, the application itself encourages physical activity: feedback about physical activity and friendly avatars will instill internal motivation, while competition with friends will complement this as external motivation. The application uses avatars as means of communication of the application with the user and these avatars send daily messages, inform the user of the progress, achieving of daily goals and so on. In our pilot research we tested the effectiveness of a “blank” application, with no avatars and no personalized messages and compared it to the effectiveness of an application, which uses these elements. Our results show that children, who used the “full” version, including the avatars and personalized messages, were more satisfied with the use of the application, used it more frequently and more frequently expressed the intention to keep using this application.

*Keywords: physical education, mobile and web application, monitoring and encouraging physical activity, human energy expenditure*

**RELATIONS BETWEEN PARTICIPATION IN RECREATIONAL ACTIVITIES WITH TIME AND PRACTICING HEALTH STATUS**

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Youth participation in sports and recreational activities is often studied area and in the modern world it is given much attention to it. However, in this region, in youth age many factors influence to participate in recreational activities, so the aim of this study was to determine some of the motives for participation in recreational activities for this population. In a sample of 72 examinees aged 16 to 32 years, who have been engaged in some of the recreational activities, we wanted to analyze their motives and attitude towards participation in recreational activities in conjunction with their health status and the time they dedicated to engagement in these activities. For the assessment of motivation the survey was used which contained in addition to basic demographic information and motives for exercise, and whether the patients identified some of the deformities i.e. what their health status. From this analysis, it was concluded that in addition to the common motives for doing recreational activities such as team spirit and a sense of satisfaction and achievement, there are differences within the group of subjects on the basis of established deformities, as well as the time of practicing the activity. Whereby, women with established deformities were motivated in different segments of the forms, health and technical level of mastering activities. The analyzed results can help in better form and content of the formation class of recreation as well as the quality of psychological work with such people, in order to recreation experts can better motivate the members of this population.

*Keywords: motivation, leisure activities, health status, dissenting time*

**INFLUENCE OF MOTIVATIONAL APPROACHES ON MOTORIC EFFECTIVENESS OF CHILDREN**

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The main purpose of our research is establishing how motivational approaches (such as award and punishment), which represent external motivation, influence pupils and their performance on motor tests. Physical education teachers are often faced with a predicament on how to motivate the pupils to be more active in classes of physical education and our research aimed to test the usefulness of different motivational approaches for getting the pupils to be more active. We defined four goals: one relates to differences between genders and the other touches age gaps. The research was made on one Slovenian primary school – Osnovna šola Ivana Cankarja Vrhnika, where 104 pupils were chosen randomly to be measured doing three motor tests (hurdles management backwards, standing long jump and pull-up on a bar). These tests are part of Slovenian “Športnovzgojni karton”, which is held every April on primary and secondary schools around the country and are familiar to children. For neutral measurements we copied their results from the mentioned documents. We found out that pupils are very susceptible to external (teacher's) influences, because after he/she motivated them with the award (and later with the punishment), they improved their achievements a lot. They made even more effort during the third round of measurements, when they would be punished (if they did not improve their every single personal result). Higher level of motivation came into view by younger children, namely girls.

*Keywords: motivation, external motivation, award, punishment, pupils, motor tests*

**AFTER PREPARATION PERIOD BALL SHOOTING ACCURACY AT PLAYERS U15**

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The main aim of the research was to identify a level of quantitative changes of the ball shooting accuracy with fifteen years old football players under the influence of the programmed football training of a six weeks preparation period. 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 ball shooting accuracy under the influence of the programmed football training with fifteen years old football players, which involved a summer preparation period and lasted forty-two days. The training programme covered forty-four training units. The research was made on a sample of 120 fifteen years old football players of cadet rank. For the assessment of the ball shooting accuracy the three tests were used: straight line foot accuracy - vertical aim, elevation foot accuracy - vertical aim and elevation head accuracy - vertical aim. In the area of comparative statistics, we used discriminant parametric procedure t-test for big paired samples. Based on the numerical values of the t-test it can be concluded that there are no statistically significant differences in all three variables to estimate the ball shooting accuracy. This confirmed the hypothesis that the expected significant positive quantitative changes of situational-motor abilities are influenced by the proposed model of training in preparation period with fifteen years old football players. 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 ball shooting accuracy with fifteen years old, because the model that is used in this training period abounds in exercises in which dominates the ball shooting accuracy. 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.

Keywords: *soccer, ball shooting, after preparation period*



## CHILDREN AND ADOLESCENT INJURIES DURING PHYSICAL ACTIVITIES

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The aim of this article is to present results of different studies about injuries occurrence of preschool and school pupils and adolescence during sports activities in the kindergarten, primary and secondary school and in their leisure time. A questionnaires have been used to question 2842 pupils from nine primary schools, 1235 students from five secondary schools in Slovenia (Videmšek idr., 2010), and 322 educators from 53 kindergartens in Slovenia (Videmšek idr., 2014). Also 178 parents from 7 kindergartens in Slovenia have been questioned (Videmšek, Štihec, Karpljuk in Meško, 2009). The results of the first study showed that substantially more pupils and students were injured in their leisure time than during physical education classes. Girls were more frequently injured in group and individual sports practiced during physical education classes and in individual sports practiced in their leisure time, whereas boys suffered more injuries in group sports practiced in their leisure time. As regards group sports, pupils and students were most frequently injured while playing football in their leisure time whereas, during physical education classes, they suffered most injuries in volleyball, followed closely by basketball and football; as regards individual sports, pupils and students were most frequently injured while cycling and rollerblading in their leisure time, whereas during physical education classes they suffered most injuries in athletics. The results of the second study showed that a playroom is the place, where also the most injuries occur. Injuries most frequently occur when running and jumping, less frequently at other physical activities. During free play, children are often injured in the outer court between 9 and 12 a.m. Boys are more often injured than girls. Educators indicate unforeseen situations as the most common cause of injury. The most common injuries are bumps on the head, especially in younger children, who stay for this reason few days at home. Parents of younger children are not so satisfied with the action of educator, when injury occurs as parents of older preschool children. Educators rehabilitate injury of the children themselves and inform parents about it. Only one third of the educators make record about injury, one half of them only when serious injury is happened.

*Keywords: injuries, sport, leisure time, individual sports, team sports, preschool pupils, school pupils, adolescence, gender.*

**EFFECTS OF PHYSICAL ACTIVITY ON SLEEP QUALITY IN CHILDREN WITH AUTISM**

**Rezende, M., Toscano, C., Cabral Júnior, C., Ferreira, J. P**

Autism spectrum disorders (ASD) is characterized by a neurobiological disorder. The literature shows the sleep disorder as secondary symptoms. The purpose of this study was to investigate the effects of exercise on sleep quality of children with ASD. Methods: A case-control study, observational, triple-blind, was used in this research. Sixteen children without medication, of an specialized Center in care of children with ASD in Maceió-AL, Brazil, with age average of  $7.7\pm 3.1$  years old for males and  $7.0\pm 4.2$  years old for females. Procedure: a) Baseline: evaluated using Scale of Autistic Traits (ATA); b) Physical Exercise program to children with ASD (PEFAUT): balance, force and coordination. The sixteen session were organized in circuit, lasting 30 minutes and frequency of twice a week. Their parents recorded in sixteen days, the number of hours of sleep in each child with and without exercise; c) follow-up: ATA reapplication. Data analysis: Wilcoxon Signed-Rank Test for comparisons before and after ATA application and paired t-test for sleep hours variables before and after baseline and sleep before and after the follow-up using the statistical package R-Studio. Results: The results demonstrated significant difference ( $p<0.05$ ) for the average comparisons before and after ATA ( $1.69\pm 1.14$  and  $0.8\pm 1.31$ ) and sleep hours ( $5.44\pm 1.71$ ). Conclusion: The PEFAUT contributes to improvement children's ASD sleep quality.

Keywords: *children, autism, sleep, physical activity*

**PARENT'S REACTIONS ON FOOTBALL MATCHES**

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Parents play an important role in the development of children's athletic careers. Their involvement in the sport of children and youth is multifaceted, including behaviour at sports matches. In this study we focused on verbal reactions of parents during the game. The testing ground for exploration accounted for 10 football matches of U-12 selection in MNZ Ljubljana. We wanted to know how often parents transmit comments, what is their content and orientation (positivity or negativity), and to whom parent's comments are mostly directed. The data obtained reveal that in the 10 matches 458 visitors forwarded in total 3830 comments, which means that every visitor forwarded on average 0.84 comments on the meeting. 66% visitors were male, which reported 82.5 % of all comments and 34.5% of women has provided the remaining 17.5% of comments. Most comments (49.4%) were focused to own child, 27.4% to the child's team, 12.4% to other children and 7.4% to a referee. The nature of comments were positive in 57.4%, in 1.6% neutral, negative in 11.3% and in 29.6 % instructional. Analysis of the results by gender shows that men and women are statistically significantly different in orientation, type and subtype of the submitted comments. The findings show that parents with their commenting create a potentially "dangerous" environment for a child, thus it is necessary to develop strategies that will curb the negative effects.

*Keywords: parents, behaviour, comments, football*

**PARENT'S MOTIVES FOR INCLUDING CHILDREN IN NON-COMPETITIVE SPORT**

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Sport programs of non-competitive nature in Slovenia are rare. The opportunities of regular involvement in sports for the young and the youngest are limited on taking part in competitive sports, that are governed by early selection which consequently brings forth a premature reach for the best results and rankings. In our research we looked at the motives of parents who have enrolled their children in a programme, where own progress comes in first place and where there is no competition. Our study included 62 parents, who had in the season 2015/2016 enrolled their children in a non-competitive swimming programme performed by the swimming school Narf. The main feature of the school is systematic learning of racing techniques in non-competitive circumstances. The obtained results reveal that the motives of mothers to enrol their children in non-competitive sports are more socially oriented, as are the motives of fathers. That parents who were once in competitive sports themselves, now enrol their children in non-competitive sports mainly for physical development, we also found that parents who participated in our study were highly educated. Parents selected swimming as the sport for their children because of the following motives: better motor development, health reasons and learning the proper techniques of swimming. They have enrolled their children in non-competitive sport because it represents less emotional stress for their children, because they are of the opinion that it is a healthier form of recreation, because of non-competitiveness itself, because it represents a more relaxed atmosphere, causes less damage and because it is less time consuming for children and parents as well.

*Keywords: non-competitive, parents, swimming, lower risk of physical injury, socialization*

**LEISURE CONSTRAINTS: A COMPARISON OF UNIVERSITY STUDENTS FROM PHYSICAL EDUCATION AND SPORTS AND OTHER DEPARTMENTS**

**Gumusgul, O., Acet, M., Isik, U.**

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The aim of this study was to evaluate leisure constraints of university students in Kutahya City, Turkey. In order to reach the aim of the research “Leisure Constraints Scale” which was developed by Alexandris and Carroll (1997) and translated to Turkish Language by Gurbuz and Karakucuk (2007) was used. The scale has 27 items. Sample of the research were 200 university students (140 male, 60 female) as volunteer, studying School of Physical Education and Sports and other departments at Dumlupinar University. In data analysis IBM SPSS Statistics 20 was used. The data were analysed with using descriptive analysis, analysis of variance (ANOVA) and independent sample t–test analysis ( $p < 0.05$ ). Tukey test was used for determining groups that show differences and level of importance was taken as (0,05). According to the findings, statistically determined that there are not significant differences on genders and departments they study on ( $p > 0,05$ ); but there are significant differences on age and academic success ( $p < 0,05$ ). It should be overemphasised that especially young people even on universities should join more recreational activities and take these activities as way of life.

*Keywords: leisure, leisure constraints, recreation, university students*

**SKELTAL MATURITY AND AGE VERIFICATION IN YOUTH FEMALE SOCCER PLAYERS**

**Osorio-Gutierrez, A., Valente-Dos-Santos, J., Duarte, J., Costa, D., Seabra, A., Castanheira, Coelho-E-Silva, M.J.**

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Skeletal age (SA) varies considerably among individuals of the same chronological age (CA). Differences between SA and CA are used to classify young athletes by maturity status. In male soccer, early maturing boys tended to be overrepresented after 14 years of age suggesting a maturity-associated sport selection process. Additionally, recent literature in male described biological maturation as source of inter-individual variation on functional capacities, maximal oxygen uptake, isokinetic strength, maximal short-term cycling protocols, left ventricular mass, fat-mass and fat-free mass. However, descriptive studies in young female athletes are still lacking. This study was aimed to report variation in skeletal age within competitive age groups in female adolescent soccer players. Methods: The sample comprised 250 Portuguese girls enrolled in competitive soccer and registered in the Portuguese federation. Participants were grouped according to CA (11.0-11.9, 12.0-12.9, 13.0-13.9, 14.0-14.9, 15.0-15.9, 16.0-16.9 and 17.0-17.9 years). SA was assessed using the Fels method (Roche et al. 1988) and participants classified as late, on time or early (Malina et al. 2012). Descriptive statistics and frequencies of skeletally maturity status were determined per age group. Results: Percentages of late maturing girls are lower than early maturing at all ages. A larger number of players classified as early maturing (69.2% and 63.9%, respectively) were found at younger ages (11.0-12.9). The age-group presenting the largest number of players classified as on-time was the 14.0-14.9 group (28.6%). Conclusion: Variation in SA tend to be larger than by CA and the distribution of skeletal maturity categories by age does not occur by chance suggesting that the phenomenon is part of normal variability during the second decade of life. Future studies need to discuss the application of indicators of skeletal maturation for age verification and also to determine the contribution of skeletal maturation to explain fitness and success in soccer.

*Keywords: biological maturation, female athlete, skeletal age, soccer*

**THE COMPARE OF SOME PHYSIOLOGICAL FEATURES SOCCER PLAYERS ACCORDING TO THE POSITIONS**

**Gunduz, B., Senturk, A.**

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The aim of this study to compare some physiological properties with biomotoric properties of football players in terms of position in which they are playing. Total sixty football players participated in the study the mean age of ( $22,83 \pm .1,89$ ), body weight( $74,30 \pm .4,82$ )and sport years( $11,82 \pm .2,665$ ) on voluntary basis. Yo-Yo Intermittent Recovery Test (level-2) was used to determine athletes's anaerobic endurance. Personal information form was prepared by researcher to get personal information regarding the participants. MS Excel 2010 were used to arrange the data and making graphic. SPSS 21.0 for Windows package program was used to analyze the data. Oneway Anova test was used to determine whether there is difference among positions where football players are playing. Tukey HSD test was used to determine significant difference according to positions. As a result, we have found significant differences in maximum heart rate, flexibility and anaerobic values in terms of position they are playing ( $p < 0.05$ ), but there is no significant difference between other parameters. Some of in terms of features physiological and biomotoric of the players who play in different positions between them have been presented in this study. This difference requires knowledge of and positions of the players selected in the property and according to this are considered to be useful to conduct special training session.

*Keywords: Yo-Yo, Anaerobic Capacity, Football Player, Position*

## **THE SPORTS RITUALS**

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The sports rituals are an inseparable element of sport. At a fundamental level, it is still not clear what function sports rituals fulfil. In our overview study, we analyzed studies dealing with sports rituals, covering the period from 2010 to 2016, searching for the terms "sports rituals, sport superstition, religious rituals in sport". So, this work seeks to clarify current understanding and highlight areas requiring further attention. It describes the influence on sportspersons and try to finds the circumstances under which sportspersons are especially committed to enacting rituals prior to a game (ritual commitment). Another aim of this work is to discuss the psychological benefits of rituals in sport and the implications that relate to rituals such as religion and personal characteristics. The results of the present overview study offer a summary of psychological contexts of sports rituals. The results can be interests of sport psychologists and managers.

*Keywords: sports rituals, religious rituals, personal characteristics, game, sport superstition*



## **COPING STRATEGIES PREFERRED BY ADOLESCENTS WHEN MANAGING STRESS IN SPORT**

**Burešová, I., Demlová, T.**

Masaryk University, Faculty of Arts, Department of Psychology

The main purpose of our research is establishing how motivational approaches (such as award and punishment), which represent external motivation, influence pupils and their performance on motor tests. Physical education teachers are often faced with a predicament on how to motivate the pupils to be more active in classes of physical education and our research aimed to test the usefulness of different motivational approaches for getting the pupils to be more active. We defined four goals: one relates to differences between genders and the other touches age gaps. The research was made on one Slovenian primary school – Osnovna šola Ivana Cankarja Vrhnika, where 104 pupils were chosen randomly to be measured doing tree motion tests (hurdles management backwards, standing long jump and pull-up on a bar). These tests are part of Slovenian “Športnovzgojni karton”, which is held every April on primary and secondary schools around the country and are familiar to children. For neutral measurements we copied their results from the mentioned documents. We found out that pupils are very susceptible to external (teacher's) influences, because after he/she motivated them with the award (and later with the punishment), they improved their achievements a lot. They made even more effort during the third round of measurements, when they would be punished (if they did not improve their every single personal result). Higher level of motivation came into view by younger children, namely girls.

*Keywords: motivation, external motivation, award, punishment, pupils, motor tests*

## **EXERCISE AND CHILDREN'S PLAY AREAS WHICH ARE NECESSARY FOR MUNICIPAL ADMINISTRATIONS, AND EXPECTATIONS OF SOCIETY FROM THESE PLACES (THE EXAMPLE OF ADAPAZARI)**

**Genc, H.I., Harmandar Demirel, D., Yaman, C.**

The aim of this study was determination of exercise and children's play areas in Adapazari and how they meet the expectations of the society. Also, by this research, it was aimed to determine new exercise and children's play areas which are needed for children and adults and to inform local administrators. 1374 people who live in the towns of Adapazari, Serdivan and Erenler and use exercise and children's play areas voluntarily participated to the research by convenient sampling method. Data collection tools were personal information form which was developed by the researchers and "Expectation Scale (short form)." Validity and reliability of the scale was previously made. The data was analysed by descriptive statistics, factor analysis for validity, independent sample t-test, ANOVA with Tukey as the post hoc analysis, and chi-square test for the comparisons. Level of significance was determined to be 0.05 in the analysis. Results showed that people's expectations from the local administrations differ according to gender, doing sport, sufficiency of sport complexes, jobs, income, sport frequency, towns and level of education. In general, it could be said that expectations of the society may differ according to various factors. The results were discussed in line with the relevant literature.

*Keywords: Municipal administrations, exercise, children's play fields*

## **STUDY ON THE REASONS WHY COLLEGE STUDENTS DO NOT ATTEND THE LEISURE TIME ACTIVITIES**

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Bartın University, Turkey

The purpose of this study is to analyze the reasons why College students do not attend the leisure time activities. In accordance with this purpose, 96 “Women” and 104 “Men”, 200 college students in total, who had been chosen by random sampling method have voluntarily participated in the study.

In the study, the screening model has been used. The sample of the study consists of the students who study at the Faculty of Sport Sciences in İstanbul University. In the research, in order to measure the leisure time constraints of the individuals, “Leisure Time Constraints Scale”, developed by Carroll and Alexandris (1997) and adopted into Turkish and its validity check made by Karaküçük and Gürbüz (2006), has been used as data collection tool in addition to the personal information form prepared by the researcher.

In order to determine the distribution of personal information of the participants, percentage (%) and frequency (f) methods have been used; in order to determine whether the data has a normal distribution, Shapiro Wilks normality tests has been applied, and as a result of this, after understanding that the data complied with the non-parametric test conditions, Mann - Whitney U and Kruskal Wallis tests have been applied in order to determine the significant differences.

Based on the gender variable, in “lack of information” sub-dimension of the leisure time constraints scale, male participants have received a higher score in proportion to female participants ( $p < 0.05$ ); and based on the age variable, in “individual psychology” sub-dimension of the leisure time constraints scale, participants aged between 18-22 have received a higher score in proportion to the participants in the other age group ( $p < 0.05$ ).

In conclusion, it can be said that the male participants, in proportion to female participants, consider the lack of information as the greatest constraint preventing them to participate leisure time activities, and that the individuals aged between 18-22 think the individual psychology as constraint.

**Keywords:** *Leisure, Leisure Constraint, College Student*

## **THE COMPARISON OF NATIONAL TENNIS PLAYERS AND MIDDLE EAST TECHNICAL UNIVERSITY TENNIS PLAYERS' ANXIETY LEVELS BEFORE THE COMPETITION**

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Tennis Players in National Tennis Team and in the METU (Middle East Technical University) Tennis Club, according to gender and teams they play in and to see if there is a meaningful (significant) difference or not among them. In general, in field of sport psychology, it is an accepted view that when anxiety is excessively increased, it will have a negative impact on performance. In his regard, by using the techniques of overcoming anxiety, efforts are made to provide help, to develop performance. Distribution and percentages of students participating in the study, are determined by Descriptive Statistics. Since the results of Kolmogorov Smirnov test, made by using the data collected, were determined to be meaningful, application of non parametric tests was decided. To examine the level of situational anxiety prevailing among the groups, before the competition, the Mann-Whitney u Test which corresponds to Non-Parametric t Test is applied. When the levels of anxiety according to gender within Teams (METU, National) were compared; despite of certain differences; it is determined that there is no significant difference about anxiety levels. However, in Statistical Analysis based on general and gender factors, among the teams, it is observed that there are differences at significant level and these differences are in favor of the Tennis Players of the National Team. In the result of this research conducted, it is observed that, the gender factor within the team, does not have an influence, on the level of anxiety. In other words, this does not have a meaningful difference, but it changes when there is a gender factor among the teams and one can see that, the difference becomes meaningful (significant).

*Keywords: tennis, anxiety, competition*

## EFFECTS OF AGE ON AEROBIC POWER IN SOCCER PLAYERS

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The ability to develop maximal anaerobic capacity is critical for success in power sports. Wingate Anaerobic Test (WAnT) as a method of measuring maximal anaerobic power as well as anaerobic fatigue (Coppin, et. al. 2012). The aim of this study is to examine the 30-second anaerobic power and body composition of young soccer players (SP) and to determine the differences between their anaerobic powers by their age. Nineteen male (age 15; mass  $58.50 \pm 7.70$ ; height  $170.07 \pm 7.71$ ) and seventeen male (age 16; mass  $64.34 \pm 6.48$ ; height  $176.24 \pm 6.71$ ) a total of thirty six male soccer players who are playing and regularly trained participated in this research voluntarily. 30-second anaerobic power and body composition measurements of SP were assessed. Body composition was assessed by bioelectric impedance analysis (Tanita TBF-401A). Anaerobic power was measured by using a 30-second WAnT. SPSS 20 program and Independent t-test were used to determine the differences between the age groups. According to research results there is a significant difference between young soccer players' weight (kg), height (cm), fat free mass (FFM) (kg) but there is no significant difference between their body mass index ( $\text{kg}/\text{m}^2$ ), fat percentage (%), fat mass (kg). Furthermore it was determined that there is a significant difference between young soccer players' anaerobic power capacities (watt/kg) and fatigue index (FI) but there is no significant difference between their minimum and maximum WAnT values (watt/kg). FFM of 16 years old SP was significantly greater than 15 years old SP ( $54.75 \pm 4.91$  and  $49.69 \pm 5.72$ ). FI and anaerobic power of 16 years old SP were also determined significantly greater than 15 years old SP ( $114.96 \pm 10.67$  and  $82.49 \pm 9.00$ ;  $7.52 \pm 0.66$  and  $7.04 \pm 0.61$ ). In conclusion height, weight, FFM and also FI, anaerobic power capacities of 16 years old soccer players were determined greater than 15 years old soccer players.

*Keywords: soccer, anaerobic capacity*

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