

**5<sup>th</sup> International Congress**

# **Youth Sport 2010**

**Book of Abstracts**

Ljubljana, 2-4 December 2010

## 5<sup>th</sup> International Congress Youth Sport 2010 – Book of Abstracts

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## **INVITED LECTURES**

# INTERNATIONAL TRANSFERS OF TEENAGE AND CHILD PLAYERS

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In December 2009, a French newspaper, *Le Monde* was reporting the very sad story of Yannick Abega, a teenage (below 18) soccer player originating from Cameroon who was just sacked by Almeria football club (Spain) where he was playing without having signed any labour contract. In fact, Abega had never signed a contract since his first transfer from Cameroon to Real Majorque in 2006, at the age of 13. Thus, the 'Foot Solidaire' association has lodged a complaint to FIFA contending "child trafficking, child ill-treatment, exploitation, and swindling Abega's parents". This story draws attention on to a typical phenomenon in today's high level sport which is an overall athlete (player) international mobility on the one hand and, on the other hand, on a specific segment of the global market for sporting talent, that is teenage and child international transfers. The problem is that in various sports transferring children and teenagers from outside Europe (basically from developing countries) is not allowed, like in soccer since the 2001 FIFA rules. Then a next issue comes up: how regulate international teenage player transfers in a way that could be more efficient than FIFA rules. Such issue is tackled in this paper. First, we describe the overall picture of international player transfers, and then we focus on outlaw and infamous conditions prevailing in international teenage and child transfers. A last part of the paper suggests to introduce in all sports, not only in soccer, a specific taxation of international player transfers, coined a Coubertobin tax whose merits are compared with FIFA rules.

**Notes:**

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## **LOW BACK PAIN IN YOUNG ADULTS WITH PHYSICAL ACTIVITY AND PREVENTIVE MEASURES**

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This work presents the data about the prevalence of LBP in young adults and its associations with physical activity as a risk factor. The results of published studies are compared to our data, which were gathered with a cross-sectional research on the sample of young adults. The sample was composed of the first year students of the University of Ljubljana at the Faculty of Chemistry and Faculty of Sport. The data were gathered using a questionnaire, which included the Graded Chronic Pain Scale (GCPS) questionnaire, a well validated tool to assess LBP intensity and disability. Results show that LBP during the last 6 months was present in 71.3% of competitive level students and in 59.2% of recreational level students ( $p=0.06$ ). Even more robust data were found in the subgroup of PE students: the intensity of pain and disability were significantly higher in students engaging in sports at the competitive compared to recreational level (intensity – GCPS points: 37/100 vs. 29/100,  $p=0.007$ ; disability 21/100 vs. 12/100,  $p=0.002$ ). In this subgroup the follow-up prevalence of LBP after the first semester showed similar prevalence of LBP as in the beginning of the study year. Our data indicate the association of higher level sport activity with low back pain which is in accordance with some previous reports. Published interventional studies show success of the specific workout programs such as Pilates. These workout programs could be used also for prevention and amelioration of LBP in physically active student population and their implementation should be prospectively studied.



**Notes:**

[illegible]

## **SPORT FOR DISABLED**

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In spite using exercises and hydrotherapy since ancient times and some individuals practising different sports in the past, the great development of sport for disabled started after the first and the second world wars. Today elite disabled athletes trained equally as able ones. Sport can be already part of the complex rehabilitation programmes. During rehabilitation we can use sport to improve functioning of a person and to convince him that he can still be active and perform different recreational activities after discharge. Recreational activities have same physiological, psychological and social beneficial effects for all. Disabled persons can participate in sports for able body persons but they may need additional equipment or adaptations. Not all sports are appropriate for all. The American Academy of Orthopaedic Surgeons has developed a "participation possibility chart" which includes some of the major physical disabilities and major sporting activities. Sport may be recommended for certain disability, appropriate for some but not appropriate for other with the same disability, adapted when almost all need adaptations of equipment or rules or not recommended at all. There are also sports developed specially for people with certain disability, for example goalball for blind. In the past some sportsmen competed at competitions for able bodied. And some have been very successful (world record, Olympic champion), but most were not competitive. That is why in 1984 the Stroke Mandeville Games for the paralysed were founded. In 1960 they transformed into Paralympic games. This year on Paralympic games in Beijing, China disabled sportsmen will compete in 20 different sports: archery, athletics, boccia, cycling, equestrian, football 5-a-side, football 7-a-side, goalball, judo, power lifting, rowing, sailing, shooting, swimming, table tennis, sitting volleyball, wheelchair basketball, wheelchair fencing, wheelchair rugby and wheelchair tennis. Due to different functional abilities of subjects with same kind of disability athletes are divided – classified into several groups with similar functional abilities. Today in several sports they try to combine together also athletes with different disabilities but same functional abilities. Medical doctor working with disabled athletes have to have a good knowledge about disabilities, their peculiarities, classification, sports and sport medicine. Exercise stress testing, prevention, therapy and rehabilitation of sport injuries, nutrition and nutritional supplements became crucial part of sport for disabled. People with disabilities may perform sport for recreation or on a competition level. Both have positive effect, whereas competition sport may also have some negative effects. Medical doctors working with these people have to be aware of all these effect and try to prevent negative ones.

**Notes:**

[illegible]

## **CARDIO-METABOLIC SYNDROME IN ADOLESCENTS: AN EARLY PREVENTION BY PHYSICAL EXERCISE**

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Physical exercise is important in the early prevention of cardio-metabolic syndrome, which is one of the most frequent diseases today. Sedentary life style, surrounded by sophisticated technological achievements, supersedes the time spent in motion in all age groups, from the earliest childhood. Cardio-metabolic syndrome (CMS) is a complex process and one of the most important groups of diseases, presenting a major health problem in developing countries. CMS is an increasing risk for coronary heart disease, stroke and peripheral angiopathy. CMS comprises overweight and abdominal-intraperitoneal apple shape obesity, insulin resistance or glucose intolerance: type 2 diabetes mellitus (some persons are genetically predisposed to insulin resistance), hypertriglyceridemia with low HDL and high LDL cholesterol, accompanied by arterial hypertension. The prevention of metabolic syndrome should start as early as possible: in the period of childhood and adolescence. However, intervention exercise programs should not be limited to younger age groups, but must encompass all age groups within population.

**Notes:**

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## **THE IMPORTANCE OF PHYSICAL ACTIVITY FOR CHILDHOOD HEALTH**

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A sedentary lifestyle is common among adults and is associated with a higher mortality rate and rates of common diseases such as cardiovascular disease (CVD), diabetes, obesity and some cancers in adults. Except obesity these problems are not manifest in children, but it may be anticipated that it becomes increasingly difficult to change to a more physically active lifestyle with higher age. There could therefore be good reasons to promote a physically active lifestyle in early life. Primary prevention as early as possible should always be preferred instead of prevention at a time where irreversible pathological changes have occurred. The latter may especially be related to metabolic diseases such as cardiovascular disease and type 2 diabetes. Obesity is increasing in Europe, but large geographical and social differences exist. The Northern and eastern European countries have less obese children than the Southern part of Europe, and obesity is more prevalent among the lower socio-economical classes. There is a rationale for primary prevention in relation to CVD, obesity and health promotion in children if the following hypotheses are true: a) a large percentage of children have a lifestyle which is so sedentary that it may increase the risk of developing obesity, atherosclerosis and other diseases prematurely; b) a sedentary lifestyle causes increased levels in disease risk factors, which is known to increase risk of premature death; c) CVD risk factors, obesity and sedentary behaviour track during childhood into adulthood; d) interventions including increased physical activity in children at risk are efficient to decrease risk factor levels and change behaviour to a more physically active lifestyle. This talk will elucidate the evidence showing that the above criteria are met, and also that there is a large potential for primary prevention of CVD and obesity in European children. Lifestyle changes should be initiated and increased physical activity should be one of the key actions.

**Notes:**

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## **W(H)ITHER PHYSICAL EDUCATION?: THE FUTURE AIN'T WHAT IT USED TO BE!**

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Despite a range of intergovernmental, governmental and non-governmental agencies' advocacy, actions and initiatives as well as national educational reforms of systems and curricula to improve provision in and for Physical Education in schools over the last decade, there is a 'mixed message' scenario: hope for a secure and positive future of this unique school subject is juxtaposed with continuing disquiet and widespread concern about its current situation and future sustainability. The disquiet is manifested *inter alia* in perceived incidences of marginalisation, reduced curriculum presence, and inappropriate curricula not aligned with the life-style needs and practices out of, and beyond, school. A concern is that school physical education is 'withering', that is, is in terminal decline. Thus, with the future in mind, the question arises: 'whither' physical education?; that is, which direction is it going or do we wish it to go? Is the 'whither' in the direction of a 'Meat Loafesque' world of dark and insecure gloom and doom or is it a sustainably positive 'blue sky' world in which problem resolution has been secured. With the intention of provoking reflective thought, this paper particularly draws from surveys' and research literature evidence on the quality and relevance of physical education curricula. It addresses a number of issues, which may challenge some well established orthodoxies and progresses to suggestions for some directions to sustain a secure future for physical education as a life-long learning and lifestyle-enhancing enterprise. They are suggestions, which embrace physical education curriculum reconceptualisation, improvements in quality and relevance with provision and delivery an involved wider community partnership imperative.



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## **AEROBIC ENDURANCE TRAINING FOR CHILDREN**

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Endurance is the ability to sustain a prolonged stressful effort or activity. When considering training for children one must respect individual physical and psychological characteristics of children at a certain biological and chronological age. Many researchers have various opinion about energy systems development with children. Some think that children can achieve relatively higher aerobic intensity than adults and some that they cannot effectively develop aerobic capacities. When researching effects of aerobic training, several studies showed relatively small possibilities for development. They reported increase of maximal oxygen uptake from 10 to 14%. In meta-analysis with 23 researches Payne and Morrow reported 5% average increase of  $\text{VO}_2\text{max}$ . From 1995 to 2001 several researches on effects of aerobic training with children were done. Even though training programs were optimally designed (HR=160-170 b/min, 8-15 weeks, 2-3 times per week), most of the researches reported 0-10% increases. Very few authors reported larger increase after training programs of 72 and 28 weeks, with greater training volume (up to 6 times per week). In the last few years both scientists and coaches believe in effectiveness of intermittent training for development of aerobic abilities. Although this method was believed to be appropriate for adolescents and adults, many researches showed positive effects with children. When comparing effects of continuous and intermittent training some authors reported significant change with both, but with larger gains with continuous group. When considering adaptability of child organism it is important fact that children show less individual variability than adults when comparing aerobic training effects. It can be concluded that research on aerobic endurance training effects shows consistent results, but nevertheless leaves room for further investigation of different aerobic training methods. Continuous methods are proven to be extremely effective and energy systems used in these methods seem to be appropriate considering children's characteristics. When implementing long-term programming it is important to use continuous methods before intermittent in order to achieve greater long-term effects.

**Notes:**

[illegible]

## **BACK TO THE FUTURE OF PE**

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Media and information technology which offer easy and immediate fulfilment are important factors of nowadays lifestyles of young people in developed countries. Many of young people live in half-virtual world of web social networks, far away from climbing on the trees and ripping trousers. In connection with some other risk factors a sedentary lifestyle is common among young people. These changes are manifesting themselves in decreased physical fitness of young people. It seems like battle is lost since also political decisions which influence on their physical activity are not in young people's favour. This paper addresses to challenge how to take advantage from modern lifestyles of youth and their parents in PE teaching. It presents concept of acquiring diagnostic data through efficient use of ICT in a future school gymnasium as appropriate learning environment. Augmented feedback given to student is one of basis to successful PE teaching and student's understanding of contents of PE curricula. There are suggestions about the role of PE teachers, students, other school subject teachers, parents, coaches and school physicians in such environment. With the help of modern technology integrated in gymnasium come back to origins of PE can be done: more physical movement, sweating, motor skills acquiring, playing, socializing, comprising with peers etc.

**Notes:**

[illegible]

## **YOUNG ATHLETES' COACHES – A PROFILE**

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A coach is an important figure in an athlete's life – for most athletes, he or she represents the way to reach their goals, the one person, who can enable realizations of dreams. Sport is a playground not just for developing and realizing success, but also for developing social skills, discipline, learning to function well under stress, to cope with opponents, problems... Thus coaches are expected to be able to give all that to their athletes and to enable them to learn all of this. We wanted to find if the coaches, who work with young athletes in Slovenia, differ from coaches, who work mainly with older athletes. 275 Slovene coaches participated in the research, coaches of younger athletes were defined as coaches, who mainly work with athletes up to 16 years of age – we found coaches of older athletes to be older ( $M_{\text{age}} = 42.72$  years,  $SD = 9.46$ ), younger athlete's coaches were 35.60 years old in average ( $SD = 9.24$ ) – the differences were significant ( $F = 38.52$  and sig ( $F$ ) = 0.00). We tested the personality and leadership characteristics, their social skills, emotional intelligence and their attitudes toward sport. We found coaches of younger athletes to be more emotional, they engage in whatever is happening at the moment more than coaches of older athletes. As a result, they sometimes have more problems with controlling their emotions – externally they might even sometimes appear emotionally unstable. It would seem that they engage in practice of their athletes from a parental perspective. We found better social and communication skills in coaches of older athletes, which seems to be the result of longer careers and thus more time to practice and develop these skills. Older coaches also demonstrate more leadership behaviour, which is oriented into practice and teaching – we believe the reason for that lies in the increasing demands for technical and tactical perfection in top sports. This result could be partially explained also by the fact that frequently coaches need to correct the mistakes of previous coaches – in Slovenia, many coaches who work with younger athletes, have far from sufficient education and far from enough knowledge to work in sport. But the prevailing opinion seems to be, that everyone with a bit of spare time on their hands, can work with younger athletes. An opinion which is by our judgement completely wrong.

**Notes:**

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## **PHYSICAL PERFORMANCE OF YOUNG SOCCER PLAYERS**

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Soccer is arguably the most popular sport game worldwide. The soccer specific training in young players may start as early as at 8 years of age. Many clubs selectively enrol promising players at a relatively early age and provide specialised programmes with the goal of developing and perfecting playing ability. However, identifying talent for soccer and other team games is more complex than in individual sports (e.g. in track and field, or swimming) where a single objective measure of performance exists. Nevertheless, most of the previous research aimed towards profiling and talent identification has been focused on the physical performance and skills of young soccer players. The studies of anthropometric dimensions, physicals performance and soccer specific skills of young players have provided partly consistent findings. Elite young players (as compared with the sub-elite ones) could be characterized by high agility and soccer specific skills. The aerobic capacity and anthropometric dimensions could be of importance for early selection as well. However, all of the above mentioned findings could be confounded by the process of maturation that may vary across the individuals with respect to their chronological age. Furthermore, characteristics that discriminate youth players could vary with age. In summary, evaluation of youth players is complex and a multivariate approach is appropriate, taking it to account individual differences in growth spurt, functional capacities and motor proficiency in puberty. Therefore, talent identification and development should be a dynamical process and provide opportunities for changing parameters in long developmental context.



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## **FUNDAMENTAL MOTOR PATTERNS IN CHILDREN AGED 4–7 YEARS**

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The alarming increase in the number of injuries of the skeleton, inflammatory and degenerative diseases of bones and joints, spinal diseases and injuries, all certainly connected with inactive lifestyles or inadequate adaptations of the fundamental motor patterns (FMP) and developmental irregularities of FMP that cause motor deformations, have encouraged us to direct our research into investigating FMP on a population of healthy children. We suppose that inadequately developed FMP can have a negative effect on the upgrade of motor stereotypes and consequently on inadequate and irregular physical activity in adulthood. Incorrect functioning of the skeleton-muscular system can have numerous negative consequences reflected in an individual's work and life, but predominantly in their health. On the basis of the chosen battery of testing with the aid of modern instruments, the presence of the chosen fundamental motor patterns – walking, running, crawling, climbing and jumping – was determined and analysed observing 107 kindergarten children in Slovenia. The aims of the research were complete kinematic evaluation of FMP; longitudinal assessment of FMP adaptation in children aged from 4 to 7 years; analysis of the adaptation interdependencies among different FMP; analysis of the impact of the morphological characteristics on FMP adaptation; and comparison between analysed FMP and life styles of measured subjects. The sample of children was and will be longitudinally monitored throughout three tests – October 2009, 2010 and 2011, beginning at the age of 4. FMP were analysed qualitatively and quantitatively with kinematics and biomechanics. An average of a representative number of cycles was assured during repetitive FMPs (gait, running, climbing and crawling) and in vertical jump as well. Kinematic analysis was performed with 3D reflective markers, while biomechanics analysis with 8-channel EMG system and force or pressure sensitive surfaces. All statistical data analysis was performed with SPSS software. After the first measurement we confirmed that there are several differences in the performance of FMP among children at the age of 4. Significant differences between and among measured boys and girls were found in all analyzed FMP and anthropometric characteristics. The results of countermovement jump, climbing and crawling and even static strength shows that coordination (inter-muscular, intramuscular and inter-segmental) is probably of primary importance in the performance of FMP at this age. Further, in combining data

that we obtained from measuring the posture in static and dynamic environments with other data – ABC, qualitative movement analyses measurement battery, objective measured quantity and intensity of physical activity with acceleration meter, and half structured interviews with subjects parents - we can expect to derive a much broader understanding of the processes in early child motor development, especially as regards FMP.

**Notes:**

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**MUSCLE FATIGUE DURING HIGH-INTENSITY  
INTERMITTENT EXERCISE IN CHILDREN: IMPLICATIONS IN  
THE FIELD OF YOUTH SPORT AND PE LESSONS AT SCHOOL**  
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Accordingly, muscle fatigue is defined as an exercise-induced reduction in the maximal capacity of the muscle to generate force or power output. In our laboratory, we have shown that the muscle power output declined in less extent during repeated bouts of high-intensity exercise in young children than in adults. For instance, using 30 s recovery periods, young boys are able to maintain their cycling peak power during ten repeated 10 s sprints whereas adolescent boys and men decrease their peak power output by 18.5 % and 28.5 %, respectively. Under such exercise conditions, 5 min recovery periods are necessary in adolescent boys and men to sustain their cycling peak power from the first to the tenth sprint. Comparable findings were also reported during consecutive maximal isokinetic knee extensions by comparing the time course of peak torque in young boys and men. Similar results were also obtained within a series of 10-s bouts of running. However, young boys and men experience greater declines in work rate during running compared with cycling. Although rarely studied, age-related differences are confirmed in females by comparing the peak torque profiles of knee muscle flexors and extensors during repeated isokinetic contractions in young girls and women. In contrast, no gender-related difference can be observed in fatigue resistance in prepubertal children. In summary, the ability to repeat high levels of power output during intermittent high-intensity activities depends upon age and probably maturation level. Prepubertal children have lower but more consistent power output in repetitious sprint activities. The exact causative factors explaining the greater resistance to fatigue during high-intensity intermittent exercise in children have not been clearly discriminated but several hypotheses related to quantitative and qualitative muscle changes during growth have been postulated. Also, it is generally accepted that the rate of fatigue development during exercise is more evident in muscles composed primarily of fibres with low oxidative capacity (i.e. fast-twitch fibres or type II fibres) compared with those of a more oxidative type, i.e. slow-twitch fibres or type I fibres. Furthermore, children may be equipped better for oxidative than glycolytic pathways, allowing a lesser production and a faster clearance of muscle by-products harmful to contraction, and a faster resynthesis of initial PCr stores necessary to the reconstitution of muscle power. This suggestion was recently supported in a recent study conducted in our laboratory, on the basis of *in vivo* measurements of the faster initial muscle pH recovery rates and the

significantly higher post-exercise PCr recovery indices obtained in children, thereby illustrating a greater mitochondrial oxidative capacity. The better clearance of muscle by-products (i.e. protons) could be facilitated, in some extent, by a faster regulation of blood acid-base balance during high-intensity intermittent exercise in children. In fact, children are able to ventilate relatively more than adults to exhale faster the carbon dioxide and decrease the partial pressure of carbon dioxide and the amount of proton into blood to a lower level. Hence, the pressure gradient for protons between intra- and extra-cellular spaces would be higher in children than in adults. Neuromuscular activation could be also considered as another factor explaining the greater resistance to fatigue in children. It has been shown that the adults who have a poor ability to achieve full voluntary activation of plantar flexors and knee extensors motor units before fatigue ensued develop less muscle fatigue during consecutive maximal and submaximal isometric contractions. Considering that children are limited in their ability to recruit and use the totality of available motor units, they cannot perform a maximal effort as intensively as adults. This difference limits the magnitude of force and power production and thereby affects the extent of the fatigue in children, especially during repeated bouts of high-intensity exercise. A practical implication from these results is that during high-intensity intermittent training, young children may cope better with shorter rest periods than are commonly used by adults. As a consequence, the combination between the various training parameters (number of sets, duration/intensity of exercise and duration of recovery) should be chosen not only as a function of the aims of the training but also according to age and maturation level of individuals. Also, given that children have a better ability than adults at repeating short-term sprints with short recovery intervals, training based on high-intensity intermittent exercises should be better considered in the athletic programmes at school to improve their aerobic and anaerobic fitness.

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## **INFLUENCE OF COMPETENT PE TEACHING ON PHYSICAL FITNESS OF CHILDREN – A 3-YEAR STUDY**

***Starc G. and Strel J.***

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Regular and quality physical activity during childhood is an important factor which can lead to improvements in numerous physiological and morphological variables in children. A major part of children's physical activity is today allocated to physical education classes in schools, which are all too frequently delivered by generalist teachers, who have been proved by many researches to be without appropriate PE teaching competences due to insufficient training and lack of experience in sport. This is especially problematic in the first years of school when children experience negative trends of physical fitness, which includes growth of obesity and diminishing of motor skills and functional abilities. Often the authorities try to improve the negative trends by special intervention programmes in schools but such programmes usually fail to produce any considerable positive long-term effects. We therefore tried to test, if there are possible alternative solutions, which can improve the situation within the educational system, without expensive external interventions or special intervention programmes, demanding additional economic and human resources. In Slovenia specialist PE teachers are allowed to teach PE already in the first years of primary school – with the consent of parents and school board and with classroom teacher present in the class – which gives us an opportunity to compare physical fitness of the minority of children whose PE classes in the first years of school are delivered by specialist PE teachers and of the majority of children, who are taught only by generalist teachers. We are able to test whether the existing PE curriculum, delivered by specialist PE teachers with higher PE teaching competencies than generalist teacher, contributes to the improvement of children's physical fitness. For this purpose we gathered data from classes of 33 primary schools (experimental) where specialist PE teachers started teaching in second year and continued teaching in third year while in the first year PE was still delivered by generalist teachers only. We then paired each experimental class with a control class from the neighbouring school (taught all three years only by generalist teachers), to exclude as many environmental factors as possible. The sample thus consisted of 66 primary-school classes with 950 children in experimental and 994 children in control group. We used the SLOfit database to extract data of 8 motor tests (arm plate tapping, standing long jump, polygon backwards, sit-ups, forward bend touch on the bench, bent arm hang, 60 m run and 600 m run) and 3 anthropometric measurements (height, weight and triceps skinfold thickness) for every included child in the first, second and third year of schooling. Since this was a cluster-randomised quasi-experiment we used the Linear

Mixed Model procedure (PASW 18 for Mac) to test the influence of specialist PE teacher teaching on the physical fitness of children by excluding gender and age and using school as a random effect. Physical fitness index (PFI) was calculated as a mean of all motor tests' mean z-scores, and body mass index (BMI) was calculated from body weight and height. The results showed that children in experimental group significantly improved their PFI in comparison with the children from control group while BMI was not affected. This proves that more competent delivery of PE curriculum positively influences children's motor development while it has a non-significant influence on their physical development. This shows that PE teachers' involvement improves the quality of PE curriculum delivery but that the curriculum itself lacks focus on the problems of obesity and this is why any change in BMI is a non-intentional coincidental byproduct.

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## **POSTURE IN SCHOOL CHILDREN**

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Proper posture seems to be an important health imperative. Its neglecting may have serious health consequences at every age. Neck, shoulder and back pain are not common only in adult population but appear among school children as well and has in 14-16 years old adolescents almost reached the same level as in adults. Many factors may contribute to back pain, including television viewing, (non)participation in sports, eating habits. In the present lecture effect of proper sitting and exercising on posture will be discussed. Increased sitting, associated with school work, use of computer, television viewing, has been associated with the increased back pain. Analysis of school sitting habits in children at age 12-14 years showed that they sat 56% of time with back flexed over 20° and/or rotated over 45°. Important reason for this may be a mismatch between school furniture and the anthropometrics of school children. However, adjusting school furniture has not only beneficial effect on improved sitting and standing posture, increased muscle strength, alleviated pain but also on better overall academic marks. Exercise is another approach to maintain proper posture. Too short and stiff rather than too weak muscles seems to be limitation for a natural well-balanced posture. This helps to set the exercise goals which should include stretching of the muscles, strengthening of the muscles and proper techniques of movement for reducing spine loading. Task of conditioning is to broadening the limits inside which technical solutions can be found. Guidelines and practical examples will be presented that can be implemented into exercise programmes.



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## **HIGH-TECH IN YOUTH SPORT: RTK GNSS MEASUREMENTS IN ALPINE SKIING**

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In the practice of youth sport, high-tech measurements and analysis are usually considered to be unnecessary or even undesirable. However, children are growing up using different types of high-tech equipment, starting with smart mobile phones and personal computers enabling advanced 3D or even virtual reality video games. As alpine skiing is a complex sport in an outdoor environment with high technical demands, different types of mechanical measurements and analysis have been used on elite skiers in the past. The purpose of this study was to use high-end GNSS measurements and analysis to help young alpine skiers to improve their racing performance. Nine skiers (age: 16–18y), members of a regional team, participated in the study. Two independent test trials were performed. In both trials, a giant slalom course setup of 19 gates was set on a glacier on the same slope during the autumn pre-season preparation period. In the first trial (Day 1), each of the participants was recorded with a high-end GNSS RTK (GLONASS+GPS) system with 99.99% position survey reliability. The system works in RTK mode with a maximum 20 Hz sampling rate  $SD = 10 \text{ mm} + 1 \text{ ppm}$  (parts per million) and  $SD = 20 \text{ mm} + 1 \text{ ppm}$  horizontal and vertical accuracy, respectively. To capture the athletes' trajectories the rover was placed in a small backpack worn by the athlete, with the antenna at the level of the upper thoracic spine (T2–T4). For each skier, velocity, energy dissipation and gate-to-gate times were calculated and compared. The data obtained from the GNSS was synchronized with video recordings for easier analysis; the overall time was measured using a Microgate starting gate, a set of Polymicro photocells, and a Racetime 2 chronometer with a resolution of  $1.25 \cdot 10^{-4}$  s. After Day 1, the skiers received extensive video and data feedback of their performance. In the second trial (Day 2), the skiers were video recorded and measured as regards their overall time, using the Microgate system. The time differences among the nine skiers from Day 1 to Day 2 decreased from approximately 1.9s (the fastest compared to the slowest) in an approximately 35-second long gate setup to approximately 1s in Day 2. Obvious technique and tactics improvements were observed from Day 1 to Day 2. The results demonstrated that high-tech in youth sport can significantly help to improve the skiers' performance. The reasons for the overnight improvements can be explained with detailed information on exactly where the skier is losing or winning time, velocity and/or energy. Furthermore, it was observed that the skiers did not believe the coaches' advice, until they have observed the irrefutable difference shown with this technology. In conclusion, such technologies can significantly accelerate the learning process.

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## **NEUROMUSCULAR FATIGUE AFTER TREADMILL SPRINTS**

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Fatigue during sprint running is manifested in a slight (100 m) to substantial (200 and 400 m) decrease in speed towards the end of the race. Speed, regardless the distance, is the product of stride frequency (SF) and stride length (SL). Therefore, the central nervous system (CNS) must be able to produce fast alternate leg movements together with high power output during the sprint stride contact phases. Power output in maximal sprints could be altered due to neuromuscular fatigue. The aetiology of neuromuscular fatigue following single, maximal sprints was not presented yet. Accordingly, the aim of our study was to analyze the type of central and peripheral alteration after sprints of different duration. For that purpose, 11 subjects performed 3 sprints on 100, 200 or 400-m on an instrumented treadmill dynamometer. Neuromuscular function evaluation was performed before the sprints (Pre), immediately (i.e. 30 s) after the sprint (Post) as well as 5 and 30 min after (Post5 and Post30). It consisted in the determination of the maximal voluntary contractions (MVC) and the maximal voluntary activation (%AL) of the knee extensors (KE), the maximal compound muscle action potential amplitude ( $M_{\max}$ ) on vastus lateralis and the low- and high-frequency doublets responses on KE. Velocity decreased by 9%, ( $P<0.01$ ), 19% ( $P<0.001$ ) and 34% ( $P<0.001$ ) at the end of 100, 200 and 400-m, respectively. M-waves were preserved after all sprints. Despite changes in evoked contractions, MVC was not altered following 100- and 200-m sprints. MVC decreased post-400-m by 14% ( $P<0.001$ ), was still depreciated at Post5 (-11%,  $P<0.01$ ) but was back to initial values at Post30. A decrease in %AL was detected at Post5 (-6.0%,  $P<0.01$ ) after the 400-m. Single twitch torque, high-frequency doublet torque and low- to high-frequency doublets ratio decreased significantly immediately after all sprints and did not recover between Post and Post5. These variables significantly increased between Post5 and Post30 but were still lower than initial values 30 min after the sprints. In conclusion, single, maximal sprints in running did not alter sarcolemmal excitability but induced progressive and substantial low-frequency fatigue and slight reduction in neural drive with sprint prolongation. Despite altered single or paired stimulations, strength loss (i.e. the conventional definition of fatigue) was only detected after the 400-m distance.

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## **SHOULD ENHANCEMENT OF TRAINING CHARACTERISTICS PRECEDE OR FOLLOW TRAINING ADAPTATIONS?**

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Theory of training suggests that training should enhance its characteristics at the moment when adaptations occur. Therefore, the enhancement of training characteristics should follow training adaptations. The alternative hypothesis may also be constructed: the enhancement of training characteristics should precede training adaptations to assure appropriate training stimulus. For testing presented hypothesis, which contradict the theory, certain training conditions were analyzed. a) The sportsman, who already reach the limit of his adaptations, cannot enhance the training on the basis of theory. Therefore the only possibility is enhancement of training without adaptations and waiting for possible effects: the unexpected adaptation, accumulation of fatigue, or overreaching. The sportsman, who still enhances his performance, can follow theoretical suggestion. However, the frequent testing should be incorporated in the system for increasing sensitivity for early adaptations. Additionally, also alternative hypothesis may be incorporated in the system. b) Enhancement of single training characteristics. During maximal exercise of short duration the depletion of the most important energetic fuel the creatin phosphate may reduce the intensity of exercise. However, after 5-7 minutes of recovery, the subject can repeat similar exercise again. This permit sportsman to enhance duration of training stimulus by repetitions. Therefore, training can be enhanced without an adaptation. During maximal exercise of long duration, this is not possible. Therefore, theoretical background should be respected. During sub maximal exercise, there are the largest possible variations, how to enhanced training characteristics before reaching training adaptations. The sub maximal intensity permits the dramatic increase of repetitions if they are separated by relative short resting intervals between (interval training). Additionally also training intensity may be enhanced by manipulating exercise and resting intervals. c) The increase of a series of training units during certain training periods (mezocycles) can be applied without accompanied significant adaptation. Coaches already practice such work during planning training throughout whole competition season. They make plans on the basis of calendar characteristics, without any relationship with possible adaptations. The manipulation with training characteristics in sport, regularly precedes training adaptations. This is in contradiction with theoretical background, which suggests that training enhancement should follow training adaptations. This suggests that this part of training theory should be rearranged.

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## **PE AND SPORTS OF CHILDREN WITH DISABILITIES**

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The relation between movement and personality development is proclaimed topic supported with various authors from Johan Comenius period. The similar principles related to development of child with disability are described. The aim of the paper is to explain basic terminology, relevant to motor development of children with disability (early intervention, early sports socialization, motor quotient, motor competence, movement literacy) and to describe the principles of adaptations. The utilised methods were documents analyses, literature review, practice based analyses. On the basis of the basic terminology the recommendations for motor development of children/youth disability are described, good examples, examples of available and frequent physical activities and sports.



**Notes:**

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**THE YOUNG AND THE SPORT: A PROBLEM BETWEEN  
EDUCATION, CULTURE AND SOCIAL PRACTICES**  
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The different processes of reform of education systems in Europe often touch only tangentially the issue of sport at school age. The lack of tradition in the educational system with respect to physical education as a subject fully integrated into education systems and the lack of appreciation of their curricula and educational content as well as the fact that sport in school has been located, from its origins in a kind of nebula or *no man's land* in which the education and culture concepts are confused usually, which has given more importance to the forms than to the bottom, along with the not inconsiderable political and media pressure on educational concepts relating to sport in school, have led both the sport and the sport-school curriculum, an *educational immunodeficiency situation*, which places the faculty and the education system with almost no ability to react, to pressing issues with nature of pandemics, are affecting not only the educational treatment of sports, intra-and extra-curricular, but also the social body, which alarms relating to health in terms of morbid obesity of children, violence in sport, doping of athletes schoolchildren and other types of abuse in sport as a framework, urging a full investigation and urgent action.

**Notes:**

[illegible]



## **ORAL PRESENTATIONS AND POSTERS**

## **TOUCH – A NEW SPORT FOR THE YOUTH** **Acker E.**

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Touch started in Australia in the early 1960s as a social game and a training and warm-up technique for rugby league. The first official Touch Tournament was held in Sydney in 1968 and then spread to New Zealand. From there the game has expanded rapidly, especially in the South Pacific and United Kingdom. The Federation of International Touch -F.I.T., founded in 1985, organised the first World Cup in 1991. The next World Cup will be held in Edinburgh from 22<sup>nd</sup> to 26<sup>th</sup> June 2011. The Federation now includes 40 member countries around the globe. There are Touch Associations in most countries, many already being members of F.I.T.. The most recent members are Austria and Portugal and soon to follow are developing nations like Hungary and Slovenia. Coaching and referee courses are held regularly all over Europe, ensuring the qualitative development of players and officials involved in Touch. The object of the game is to score more touchdowns than the opposition. The ball may be passed, knocked or handed between onside players of the attacking team who may in turn run or otherwise move with the ball in an attempt to gain territorial advantage and score. Defending players prevent the attacking team from gaining a territorial advantage by touching the ball carrier. Touch is a unique and independent sport that can be played without fear of injury. It's a minimum contact sport, with simple easy-to-learn skills and one of the rare sports played in mixed teams, suitable for mixed gender PE lessons. Touch is a dynamic team sport with rules set up to encourage fairness and honesty all the way from social to the top competitive level. The game helps to develop essential skills and fitness for both boys and girls (flexibility, agility, coordination, concentration...). Touch can be played with minimal facilities and equipments (as kicking is not part of Touch, posts are not required). The basic rules of touch are: a) to score more touchdowns than the other team, b) the attacking team (team with the ball) moves the ball towards their attacking scoreline by running with the ball and/or passing the ball amongst the team, c) the defending team attempts to halt the progress of the player in possession by effecting a touch on him/her, d) when this is done successfully, the player in possession must restart the game with a rollball at the mark where the touch was effected, e) a team gets 6 chances (touches) in a set after which the ball is handed over to the other team, f) after a touchdown, the game is restarted by a tap midway along the halfway line.

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## **EFFECTS OF ADAPTED SWIMMING PROGRAM ONTO ORIENTATION IN WATER OF CHILDREN WITH NEUROMUSCULAR IMPAIRMENTS**

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Radovanović D.<sup>1</sup>, Dimitrijević L.<sup>4</sup>, Hadžović M.<sup>1</sup>, Jorgić B.<sup>1</sup>  
and Bojić I.<sup>1</sup>**

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Swimming is one of the activities that persons with this type of diagnosis can perform. In children with cerebral palsy, paraparesis, muscle dystrophy, multiple sclerosis, paraplegia performing this type of physical activity (through several types of adapted programs of swimming, hydro therapy, aqua therapy, balneal-therapy) depending on a degree and kind of diagnosis, intensity and duration, one can significantly improve or maintain: good pulmonary function, cardio-vascular system, muscle and joint function, good balance walking, self-concept, self-esteem, integration in the environment, everyday skills, etc. The purpose of this research is to show the effects of adapted swimming program on children with neuromuscular impairments. The research sample consisted of 7 children with neuromuscular impairments (cerebral palsy, paresis, spina bifida) age 5 to 13 that are participants regardless of their swimming knowledge. Sample of variables consisted of one multi-item test WOTA2, swimming knowledge test for persons with disabilities. WOTA2 has 27 particles (questions that are being answered via evaluation grading from 0 to 3). For determining the level of water orientation basic statistical parameters were applied at initial and final measuring and differences between initial and final measuring were determined by applying t-test for small dependent samples. It is noticeable that there are relevant differences between the measuring, in favour of the final one. Namely, in all mental adjustment tasks (tasks 1 to 14) there was a statistically relevant improvement in the final measuring. We are assuming that the adaptive swimming program influenced this phenomenon. The participants were almost unable to control their balance and movements at the beginning of the program and now they have a significant increase in four of the tasks (tasks 15 to 18). Although there is no statistical relevance between initial and final measuring in other balance and movement control tasks, there is an obvious improvement thanks to the program (tasks 19 to 27).



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## **THE DEVELOPMENT AND USE OF MODEL OF SUCCESSFUL- NESS FOR YOUNG CATEGORIES IN ALPINE SKIING**

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In Slovenia expert modelling is an important part of planning and analysing the effects of training of different categories of competitors in alpine skiing. With the help of the SMMS program package, marks were computed at all levels of a potential model of successfulness. Marks computed for an individual competitor as well as for the whole group serve the coaches as a useful orientation when planning and conducting the training process. In the second part of the survey, we tried to establish the connection between the marks calculated by means of the expert system method (heuristic approach) and the criterion variable. We computed Pearson's correlation coefficient for the sample of young competitors in Alpine skiing and thus confirmed the statistically significant connection between the calculated marks (expert system method) and the actual successfulness (points won in the Argeta Cup competitions). The result ( $r=0.47$ ) obtained is a relevant indicator of the validity and appropriate configuration of a reduced model of potential successfulness which forms a basis for the planning of the training process and the selection of young competitors.

**Notes:**

[illegible]

## **SUMMER HOLIDAYS: AN EXAMPLE OF ACTIVE HOLIDAY PROGRAMME**

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The results of researches show that lack of physical activity of children and youth, and bad eating habits have an impact on the increase of overweight and obesity both in Slovenia and abroad. During summer holidays, the upward trend in body weight and obesity is increasing while the functional and motor skills deteriorate. The aim of the project Summer holidays on Faculty of Sport was to prepare an active holiday programme, based on physical activity, healthy nutrition and social competences of children and youth and would be suitable for implementation to the whole of Slovenia, taking in to account the environment where the project is carried out. Based on research results and expertise knowledge we have developed quality indicators for active holiday programs for children. We developed the pilot project for three years. To monitor the intensity of programme we used SeanseWear energy expenditure monitors and questionnaires for parents to monitor the quality of programme. In three years the program attended over 1600 children, 600 of them in 2010. Our results show that energy consumption on Summer holidays on Faculty of sport was 20 percent higher in comparison to similar program on the market. The analyses of questioners show that parents find the intensity of program and quality of nutrition as the most important factors of our programme. When planning active holiday programmes for children and youth, a special attention needs to be paid to choosing teachers, the content of the program and the quality of nutrition. To increase intensity of the program proper methods and organisation forms have to be used. With the support of relevant institutions, the program would be suitable for implementation to Slovenian schools and affordable for all children, with no regard to their social background, which is consistent with the guidelines European Union.

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## **ANALYSIS OF TRANSFERS OF SLOVENIAN FEMALE HANDBALL PLAYERS IN 2009/10 SEASON**

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The problem of the study was an analysis (reasons for transfer, duration of transfer and the subjective evaluation of their success) of transfers in Slovenian women's' handball. Basic data, obtained from the EHF base: start and finish release, country from and country to) and socio-demographical characteristics: age and gender. Interviews have been carried out with all 13 Slovenian players (average age 26 years; min:19 max: 37) who have been playing abroad in 2009/10 season or before). In studied competitive season 70 Slovenian handball players played abroad, 57 were men (81.4%) and 13 were women (18.6%). Women most often obtain work in Spain (3) and Austria (3), less often in Germany or in Scandinavian countries, in contrast with men who acquire a contract in latter countries most often in average three seasons (min1 -7 max). Most of them (5) have stated that they have wished to change the environment, as they did not consider having possibilities for personal and professional development in Slovenia anymore. The pay was of secondary importance. Three (3) players have looked for possibility to maximise their pay towards the end of their careers. The earnings of these players amount is between 500 and 7.000 EUR per month after deductions. In average, these players have changed two clubs abroad. Both basic social status as well as motives for migrations differs significantly in Slovenian female handball players. Main reason for increased number of migrations are general changes in the society and globalisation, changed social ways of life; the second main reason is an increase of the qualitative level and European recognition of Slovenian female handball. The basic motive beside pay for female players is also changing the setting and getting to know new sports and cultural environments; connecting sports career and study. Generally speaking, it could be concluded that Slovenian female handball players rarely choose professional sports career. The reasons are multi-layered.

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## **BEATING DESTRUCTIVE HABITS WITH PHYSICAL EXERCISE AND DIFFERENT SPORTS**

***Borštnar I.***

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Our educational institution »Vzgojno-izobraževalni zavod Višnja Gora« helps adolescents (aged 15 to 19) suffering from emotional and behavioural problems by providing them with accommodation, day care, and education. Before their placement to our institution most of these adolescents heavily experimented with alcohol, drugs and promiscuity; often, they were involved in criminal acts together with their peers. For many of these adolescents such destructive behaviour represented a specific lifestyle. Despite the fact that these people are very young, their risky behaviour resulted in several negative consequences, such as failure at school, frequent conflicts with the teachers, peers and the parents. Some of these adolescents tried to solve their problems by running away from home. For some adolescents and their parents the vicious circle of unsuccessful discussions broke with the unanimous decision for the arrival to our institution (by a decree from a social work centre); in some cases, the adolescents were faced with a forced placement to our organisation (by court decree). On their arrival the adolescents are informed about the house rules, such as waking up, morning hygiene, breakfast, departure for school, morning lessons, lunch, as well as about afternoon leisure activities with their peers and educators. At first, the adolescents are not really sure what to do after school, so they waste their time sitting behind their computers and other media, such as Facebook. Since these young people lack self-initiative and creative, alternative ways of spending their time, they refuse to abandon such, passive activities. After they had often complained that there was nothing to do, that there was no place to go, and that they were bored after school, the school staff decided to design a structured set of free time activities for them. Now, our boarders are placed into 5 different groups and the educators from each individual group decide which activities are appropriate for their youth. Our group, for example, has been offering a wide range of sports to its members – thus, both the educators and the youth ride their bikes, rollerblade and practise different sports, such as football, basketball, volleyball, badminton, and table tennis; we also enjoy swimming, weekly skiing lessons, horse riding, and learning about horses and the appropriate methods of looking after them. I believe that these leisure activities are really effective because they encourage our youth to test their skills and abilities and, also, provide them with a wide range of opportunities for social learning and intrapersonal skills development, so I have decided to present them at Youth Sport 2010.



**Notes:**

[illegible]

## **YOUTH WITH PROBLEM BEHAVIOUR AND SPORT PARTICIPATION**

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Children and adolescents with behavioural problems participate in sports to a relative low degree. This brought Dutch government to the question to what extent sports participation for these groups is beneficial in handling their problem behaviour and (assuming sport participation is beneficial in one way or another) in what ways sport participation of these groups can be enlarged. Three ministries commissioned the Verwey-Jonker Institute to carry out an exploratory research into these questions. We answered the following central questions: In what way can as many children with internalizing and externalizing problem behaviour as possible participate in sports in a 'regular' way and how can they physically and mentally profit from this participation? How can sport participation contribute to the prevention of problem behaviour? We distinguished between participation in school sports and in sports at clubs and other non-school facilities. In order to answer these questions, we firstly made use of a simultaneously executed research by our colleagues from the Mulier Institute. By using available datasets, they compared the level of participation in sports between youth without problem behaviour and youth with internalizing and externalizing problem behaviour. It clearly marks out that youth with internalizing problem behaviour participates significantly less than 'normal' youth. Youth with externalizing problems participates less, but the differences with 'normal' youth are hardly significant. The Mulier Institute concludes that barriers to participate in sport are found in different behavioural characteristics of these young people, in environmental characteristics of sport facilities and clubs, in team versus individual sports, physical demands, and skills and motivation of coaches. In general, these groups benefit from sport participation. Positive experiences, fun, an emotionally safe environment, commitment from participating youth and a match between the type of sport and the problem behaviour (especially in case of relatively large problems) are important conditions. In addition, we interviewed a dozen of experts on the sport participation of these groups. We focused on questions as how to facilitate regular sport participation and how to use sport participation as an intervention to prevent or reduce problem behaviour. We also asked these experts for 'good practices' in promoting sport participation of youth with problem behaviour. We selected 14 projects, and – thirdly – described these projects in terms of goals, methods, results and factors that contributed to, respectively impeded, positive outcomes. Finally, the results of the literature overview, the interviews and the project descriptions were laid back and discussed in an expert meeting, to sharpen and test our conclusions. The main conclusions are that a safe environment is essential, that school plays a

key role in promoting sport participation of these groups, that it is of crucial importance whenever possible to involve parents, to make use of sport clubs and facilities that feel responsible for these groups and to promote collaboration between schools, sport clubs and facilities, and welfare organizations. Finally, it is important not to neglect youth with internalizing problem behaviour, whose problems are often less eye-catching.

**Notes:**

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## AN INVESTIGATION OF BILATERAL DEFICIT IN COUNTER MOVEMENT JUMPING IN YOUTH BASKETBALL PLAYERS

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In several studies, it has been reported, that in a two-leg vertical jump, humans achieve less than twice the jump height they are able to reach in a one-leg vertical jump. Bilateral deficit (BLD) is an acute effect associated with maximal voluntary bilateral leg muscle activation. It can be the result of biomechanical effects related to movement changes (unilateral, bilateral) or due to neural effects influencing muscle activation during maximal voluntary contraction. The purpose of the present study was to investigate the BLD in youth basketball players. The sample consisted of 47 basketball players which competed at the European Championships for U16 and U18 Men in the year 2009. The sample included 21 players of U16 Slovenian national team ( $15.77 \pm 0.44$  yrs,  $80.9 \pm 12.8$  kg,  $190.7 \pm 7.3$  cm, body mass index  $22.3 \pm 2.3$ ) and 26 players of U18 Slovenian national team ( $17.05 \pm 0.80$  yrs,  $84.8 \pm 12.2$  kg,  $191.9 \pm 7.9$  cm, body mass index  $22.9 \pm 2.1$ ). Among them are 17 guards, 17 forwards, and 13 centres. Each subject performed five two-leg counter movement jumps (CMJ), and five one-leg counter movement jumps with the dominant leg (CMJ\_D) and the non-dominant leg (CMJ\_ND). The dynamic variables of vertical jumps were measured by force platform. The *bilateral index (BI)* was calculated using the method:  $BI\% = 100 [(CMJ / (CMJ\_D + CMJ\_ND)) - 100]$ . A BI value deviation from zero indicates the difference between unilateral and bilateral jumps.  $BI > 0$  indicates that the value of the two-leg jump (CMJ) heights is greater than the sum of the dominant (CMJ\_D) and non-dominant leg (CMJ\_ND) heights in the one-leg jump.  $BI < 0$  indicates that the value of the two-leg jump heights is smaller than the sum of the dominant and non-dominant leg jump heights in one-leg jumping. Negative BI indicates a bilateral deficit (BLD), while positive BI indicates bilateral facilitation (BFC). The ANOVA for repeated measures was used to analyse the differences between U16 and U18 team. The height jumped from two-leg (CMJ) ranged from 24.39 cm to 43.70 cm in U16 team and was statistically lower than the height jumped in U18 team, which ranged from 30.90 cm to 51.65 cm ( $p < .001$ ). The height jumped from one-leg (CMJ\_D, CMJ\_ND) ranged from 11.63 cm to 23.63 cm in U16 team and was statistically lower than the height jumped in U18 team, which ranged from 16.70 cm to 29.92 cm ( $p < .001$ ). The height jumped from one leg was 59.1% of that jumped from two in U16 team, and 60.5% in U18 team, which compares favourably with the ratio reported by previous researches. The mean value of the impulse of force (IMPF) produced in two-leg jump was  $210.3 \pm 31.7$  Ns in U16 team and was lower than the IMPF in U18 team, which was  $238.5 \pm 30.0$  Ns ( $p < .005$ ). The mean value of the IMPF produced in one-leg jump was  $161.5 \pm 25.0$  Ns in U16 team and was lower than the IMPF in U18 team,

which was  $184.2 \pm 21.7$  Ns ( $p < 0.005$ ). The comparison of values of both one- and two-leg jumps showed that the bilateral index in two-leg jumping ranged from -27.26% to 12.48% in U16 team, and -36.5% to 15.65% in U18 team, which indicated both the BLD and BFC. If BFC is found, as evidenced by unilateral jump heights of less than 50% of the bilateral conditions, jump training with a single leg (plyometrics) should be emphasized. This recommendation may be especially important for basketball players who are involved in specific basketball movements which require single leg activities (agility) or jump take-offs, to develop unilateral power (unilateral strength exercises).

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**ANAEROBIC POWER IN MALE SUBJECTS OF DIFFERENT  
CHRONOLOGICAL AND BIOLOGICAL AGE**

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The aim of the present study was to determine and compare the anaerobic power parameters (mean and peak power) in the subjects of different chronological and biological age. The first group of subjects (boys, n=30) was composed of preadolescent boys at the chronological age of  $11.2 \pm 0.4$  years, Tanner's pre-pubertal stage 1. The second group of subjects (men, n=30) was composed of male adults at the chronological age of  $20.1 \pm 0.5$  years. The investigation protocol included anthropometric measurements and two series of Wingate anaerobic test. The mean and peak power output values developed during the Wingate anaerobic test is lower in boys than in men even when it is expressed by total (absolute), body mass or fat free mass unit. The results of our and similar investigations undoubtedly point out that in comparison to adult males, preadolescent boys appear to be limited in their ability to perform short-term anaerobic exercise. Research is still needed on the specific developmental stage at which an individual acquires the adult characteristics for anaerobic exercise.

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## **DIFFERENCE OF SPECIFIC MOTOR INDEX INDICATORS IN YOUNG WATER POLO PLAYERS AFTER THE PREPARATORY PERIOD**

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Training work with junior age groups requires constant control in order to control the work effect. Permanent testing, as a manner of monitoring, i.e., training control can indicate to intensity and direction of changes that occur after the completion of training period. General and specific dry land and tests in water are usually used for monitoring the development of young water polo players (up to the age of 12). The comparison of the test indicate to a possible change in the level of motor abilities influenced by training, but based on such methodology procedures it is very hard to define the structure of the occurred changes. The aim of this paper is to obtain, based on the index indicators of motor abilities at the initial and final measurement, the structure changes occurred after training. The obtained information should primarily be used for improvement of training work. For the purposes of this paper, 20 water polo players were monitored for 12 weeks. The said period included 72 training days. The change of motor abilities structure was monitored through five variables – index indicators, calculated as relations of 8 motor tests. All index variables were subjected to descriptive statistical analysis and MANOVA analysis. The results displayed that, on general level, between the initial and final measurement there is a difference (Wilk's Lambda = 0.626 for  $p = 0.045$ ). The only statistically significant difference was established in the index (BaCL-IS10 x) – relation between throwing the ball at distance in water and jumping 10× from the basic water polo position to touch the crossbar with hands. The results show that there were statistically significant differences in both basic variables, and since both techniques base the performance on leg stroke, we can conclude that the training work contributed to the improvement in the performance of motor actions very significant in certain game segments, dominantly realized in vertical position. Such consideration of the obtained results should enable better understanding of the training process effects and the structures of changes resulted after training, and thus affect the methods and metrology procedures of training process control.



**Notes:**

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## **DYNAMICS OF THE FACTORS MOTIVATING YOUNG PEOPLE TO DO SPORTING ACTIVITIES**

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Lifestyle of today's young population is affected by a number of technical achievements in the most versatile areas of human activity, leading to restriction of the natural and purposeful motor activity, increasing the proportion of passive leisure. A particular problem is hypokinesia of the young generation, resulting in a growing number of so-called lifestyle-related diseases already at an earlier age. Therefore, it seems justified to know the actual causes of musculoskeletal inactivity of today's young generation and their motive for sports, respectively interests and attitudes of today's young generation as a possible basis for appropriate interventions in the field of motor programmes. The paper describes and examines the fundamental factors affecting the attitudes and motives of young people towards sporting activity. The authors' work focused on the problem of defining the lifestyle of today's young population, identified by the popularity of physical activity, the frequency of its implementation, respectively causes of inactivity and barriers that prevent young people from the implementation of physical activity. The present study is part of an ongoing research on physical activity and active lifestyle of today's young generation. To obtain empirical data on attitudes and motives of today's younger generation towards sports activity, modes of leisure time and the reasons for motor inactivity, we used the method of questionnaire survey. During further data processing, we used the methods of logical analysis, frequency analysis, data evaluation and percentage aggregation.

**Notes:**

[illegible]

## **WILD-WATER KAYAK AS A RECREATIONAL ACTIVITY FOR DIFFERENT AGE GROUPS**

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Wild-water kayak is a sport, which has all the requirements to make up for a lively and interesting recreational activity – it takes place in nature, it allows us to fully test our abilities, allows us to spend time with our friends. There are many different types of people, who participate in this sport and also many different reasons, why people participate in it and the scope of this research was to test the differences of different groups of recreational kayakers – we compared their psychosocial aspects from several perspectives, particularly we focused our attention to young recreational kayakers. We tested 96 recreational kayakers, who have filled out a questionnaire, comprised from 59 questions. The questionnaire was composed by ourselves, since no such appropriate instrument was found. We found one of the most frequent motives for engaging in this sport to be the natural environment, the adrenaline, associating with one's friends and testing one's abilities followed closely. Among the least important motives for choosing kayak as recreation was care for health / care for good appearance, which differentiates this type of recreational activities from fitness, aerobics and similar types of exercise. Our respondents also state that sport is a value to them, which is similar to previous findings. Kayakers, who row in more demanding rivers, enjoy in nature more and trust their partners more than kayakers, who select simpler rivers, whilst the ones, who select medium difficulties of rivers, exhibit the highest need to control the situation. Kayakers, who have been engaging in this sport for longer and more frequently, engage in this sport because of the challenge, because of the nature and because they trust their partners more. Younger kayak riders seem to be motivated by the challenge, which is understandable since they have a lot to learn in this sport – such occurrences and motivational structures are frequent in sports, where experience is important.

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**THE RELATIONSHIP BETWEEN EXERCISE NEEDS AND  
CLASS SATISFACTION FOR DANCE SPORT PARTICIPANTS  
AT UNIVERSITY GENERAL PHYSICAL EDUCATION CLASS**

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University general physical education class has been changed from a requirement course to an optional course for students at the university. In this respect, curriculum also has been changed from school-based into student-based, which moves away from the necessity and importance of university education and cannot play a proper role as a university physical education. Since we cannot leave the problem of university physical education unsolved any longer, this study will examine an exercise needs and class satisfaction by focusing on participants in dance sport class at the university that is part of university general physical education course. This study is to examine the relationship between exercise needs and class satisfaction for dance sport participants at university. Dance sport participants at university in Seoul and Gyeonggi territories were subjected to questionnaire and the collected data of 273 participants was used for practical analysis based on convenience sampling. Based on the theories and precedent studies of various useful academic disciplines, questionnaire consisted of 2 individual characteristics of sex and education grade, exercise needs using questionnaire from Seo Hui Jin based on needs of sport participation, and class satisfaction using questionnaire from Gi Jung Eun. By utilizing SPSS WIN 17.0, multiple regression analysis was implemented. A need to boast is a sub-factor of exercise needs and influences class management and class instruction. Needs of purification influence class management, class instruction and class environment. In addition, needs of body shape influence on class management and class environment. Regarding the explanatory power, class management toward exercise needs variables is 19.0% and class instruction is 26.3% while class environment is 18.3%.

**Notes:**

[illegible]

## **ETERNAL QUESTION OF COACHING: DOES COACH'S PERCEPTION OF YOUNG ATHLETE'S PERSONALITY STRUCTURE INFLUENCE HIS/HER MOTIVATIONAL BEHAVIOR?**

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The coach is one of the most important factors which influences athletes' development and progress as well as athletes' career. Leadership in sport is an interactive process between coach and his/her athletes. It means that coach's behavior affects and is affected by athletes, making leadership not unidirectional event, but an interactive process. Since athlete's personality structure is one of the dispositional factors that define which behavior of the coach would be perceived as preferred, we can assume that coach modifies his/her behavior in according to own perception of athlete's personality. Therefore the aim of the study was to research whether coach differs in his/her behavior (motivational behavior in particular) toward the athlete in relation to his/her perception of young athlete's personality. The sample consists of 42 young perspective athletes (30 boys, 12 girls; age:  $M=14.07$  yrs,  $SD=2.41$  yrs) and their 9 coaches. On average athletes were committed to sport for 5.74 years, of which last 2.69 years they trained with this particular coach. Coaches (2 female, 7 male) were asked to complete The Inventory of Child Individual Differences and answer the questions of The Young Athlete in Comparison to Others semi-structured interview. YACO was designed to elicit coach's perceptions of individual characteristics of an athlete and his/her particular behavior toward the athlete. Answers to the YACO interview questions were content analyzed. Hierarchical cluster analysis was performed to calculate characteristics of coaching types. Each athlete was than ascribed to the prevailing coaching type, characteristic for interaction between individual athlete and his/her coach. Differences between athlete's personality characteristics in regard to different coaches' type were calculated using one-way ANOVA and post-hoc multiple comparisons. Results of hierarchical cluster analysis of YACO showed three distinctive coaching styles: A) adaptable democratic coaching style in a positive motivational climate, B) coach as educator in a negative motivational setting, C) coach as friend/confidant in a laissez-faire setting. Coaches didn't use same coaching types to all of his/her athletes and adapted their behavior regarding their perception of athlete's personality traits. Type A and type B of coaches significantly differ in perceiving athletes' conscientiousness. When ascribing other personality domains, there were no significant differences between three types of coaches. This confirms hypothesis that coaches adapt their coaching behavior according to their perception of athlete's individual characteristics (personality). Results are in line with mutual influence leadership theories.



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## **GROWTH, WEIGHT STATUS AND MOTOR PERFORMANCE IN ITALIAN PRIMARY SCHOOL CHILDREN**

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The predominant sedentary lifestyle of the present child population involves a reduction of the motor capacities and variations of the weight status. The aim of this study was to assess the relationships between motor performance and weight status in primary school children from Bologna (Emilia Romagna, Italy). The body weight (BW) and height (H) were assessed in 717 children (M: 368; F:349), aged 6 to 11 yrs. The weight status was classified according to IOTF cut offs. All the children performed then 8 motor tests: Handgrip Test for Maximal Isometric Strength (HND), Sit and Reach (SR), Dynamic Balance Test (DBT), Eye-hand Coordination Test (ECT), Standing Long Jump (SLJ), Upper Limb Explosive Strength Test (UST), Dotting Test (DT), Comma Test (CT). Three way Analysis of Variance (ANOVA) was used to analyze the differences in each test performance between genders, age groups (6 to 11 yrs), and weight status groups (underweight, normal weight, overweight). Male children performed better than female in HND, ECT, SLJ, UST, DT, while in SR and CT the female performed better. No significant differences between genders were observed for the DBT. The scores in all tests showed a trend to improve with increased age. However, the performance in frequency movement tests (DT and CT) showed a trend to stabilize at the age of 8 and 9. Overweight children performed better than the other groups in HND and UST, while normal weight children performed better in SLJ. No differences were observed for the other tests. The interactions were not significant for any test. The results showed that overweight children were disadvantaged in activities where the subject is engaged to develop force against gravity. Conversely, in static tests where action against gravity is not demanded, the subjects in overweight category, show better performances. Normally the males introduce better performances, regarding the females, with the exception of the SR test and in CT where greater precision and executive rhythm are required.

**Notes:**

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## **SPORT PSYCHOLOGIST WORK ANALYSIS IN A SPORT CLUB IN A PERIOD OF 5 YEARS**

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Sport psychologists help athletes to reach their goals. Their work is based on different psychological recognitions and techniques, so that athletes can show optimal performance - what are they capable of in one particular moment. Psychologist deal with psychological, emotional and cognitive aspects of a competition. Usually he is part of a bigger team and his work concerns also work with coaches and parents. Effective and good psychological work needs continuous work over a certain period of time. Long time work was not possible in Slovenian sports clubs in the past, because of different reasons (financial, staff, motivation deficits, etc.), but in the last 10 years situation has improved. The purpose of this work is to show and analyze continuous work of a sport psychologist in one Slovenian sport club. We will represent work methods and techniques, which we used on athletes (group, and individual) and coaches. Our conclusion was that continuous psychological work brings positive effects on athletes' performance, sports results and personal development of young athletes.

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## **ANALYSIS OF COMPARISON BETWEEN CRAWLING AND CLIMBING PATTERNS**

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Elementary movement patterns (EMP) play an important role in each child development from the child's birth onwards. Crawling on belly, as the first EMP, which allows the child to move around independently, in addition to the seating and walking, it is a milestone for the symmetric development of posture and balance. Based on experience with crawling on belly it is possible to predict the speed and efficiency of crawling on hands and knees. Crawling development follows the development of other, more complex EMP (walking, running, climbing etc). Climbing begins to emerge as soon as each child masters crawling on hands and knees and his or her curiosity of exploring higher-altitudes emerges. Some authors describe climbing as an activity where each child uses support points and equilibrant positions which helps them to move in different directions. The aim of the study was to compare EMP of crawling on belly with climbing. As we know crawling is a typical pattern of non-compensated moving, where children have to resist the gravity. In addition, climbing is very important for a symmetric development of posture, and helps to develop overall body strength and locomotion skills. The data was obtained from the National J5 core project – 2397. The sample consisted of children coming from the kindergarten of Koper and Škofije (N = 107) was analyzed. Previous analysis shows that appropriate implementation of EMP by children is reducing. The performance of crawling and climbing were evaluated with the rating of inherent pattern of diagonal reciprocal innervation, view orientation during the execution of the movements and speed of crawling and climbing. We want to determine, if the correct execution of crawling is linked with correct execution of climbing and with which type of climbing it is connected the most.

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## **THE CHANGES OF BODY COMPOSITION DIMENSIONALITY AMONG SOCCER PLAYERS AT THE AGE PERIOD 12 TO 14 YEARS**

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Growth represents quantitative extension of dimensions of an individual as a whole as well as his/her particular parts, and the term development is linked to qualitative changes owing to functions maturing and the structure of particular organs or systems. In this period among children happens quickened organism growth and development which leaves significant trails on individual's later life. The changes of body composition dimensionality represent the considerable growth and development indicator, as well as exercise activities and the soccer players' nutrition and they also give the guidelines for the purpose of further training observation and planning. The body composition is determined by the method of bioelectrical impedance (Bioelectrical Impedance Analysis) – BIA. The aim of the research was to identify the changes of dimensionality of the body structure among soccer players at the age period 12 to 14 years. The research was conducted on the sample of 164 soccer (football) players divided into three categories in accordance to growth (U12, U13, U14) which form part of pioneering football players of four clubs in Bosnia and Herzegovina. For all variables the descriptive parameters were calculated and the changes of dimensionality were defined by unidirectional variance analysis. The results show that height and mass of examinees statistically significantly becomes different at the age period 12 to 14 years, and the curve incline of the growth shows that the increase is more intensive from 13 to 14 years and has continued trend of growth. (BMI) which represents value proportion of body mass (kg) and value square of body height (m<sup>2</sup>), has continued trend of growth as well as these two variables. (BMR) which represents daily minimal level of energy or calories which are needed for organism functioning in peace, (FFM) share of fat-free mass in total mass and (TBW) which represents total amount of water in the body, have also continued trend of growth in this period and it makes on continued line with larger increase from 13 to 14 year. The amount of liquid expressed in percentage of body mass is stable and it amounts to 64.67% (14 years). Among the quantity of fat tissue in total mass of the body (FATMASS) an abrupt increase is evident at the period from 12 to 13 years. In that point is come to curve change and decreased but continued quantity declining of fat tissue to 14 years. The percentage of fat tissue (FAT%) in total mass has the similar growth curve, except that here the continued increase is notable at the period from 12 to 13 years (2%),



and then abrupt decrease of percentage share of fat at the period to 14 years (3.5%). The variable that has continued value decrease is (IMPENDACE) which represents resistance in the body of examinee. According to obtained results the general conclusion can be brought about that the soccer players at the period from 12 to 14 years have the accelerated growth and development, accompanied with increase of the muscular and bone mass and decrease of quantity and percentage of fat share in the body composition. There is statistically significant trend of changes in the body composition among majority of variables and on the level ( $p < .01$ ). At variable that defines the fat share in the body mass (FATMASS) trend of changes is statistically significant on the level ( $p < .05$ ).

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## **SPORT AND HEALTH**

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Sport and health are often mentioned in relation to each other. The fact is that the individual studies confirmed that a sports activity (running, swimming, cycling, rowing, etc..) impact on improving the functioning of cardiac vascular system, as well as the many studies that conclude that gymnastics increases mineralization of bone tissue and bone to become stronger, which is especially important in old age as a defense against osteoporosis. Unfortunately on the national or regional level there is no published link between active sport and health. The Slovenian Olympic Committee, Sport for all Department wanted to determine whether the proportion of organized sports active population in the region have impact on the proportion of sickness of the categories of diseases. From municipal authorities we get information on the number of sport clubs, and the number of members in them in 2009. From the Statistical Office of the Republic of Slovenia Statistical Yearbook 2009, we took social and demographic information on municipalities in 2009. From Agency for public finances were obtained from data on the financing of sports programs in the municipalities in 2009. All of the aforementioned data were then merged according to the classification of individual municipalities to a certain statistical region. From the Institute of Public Health (Health Statistics Yearbook 2008), we summarize the details of the treatment of some diseases at the primary level, divided by diagnosis according to international classification MBK10, shares have been classified according to 1000 people to the statistical region. The Pearson correlation coefficients are significant at  $p < 0.05$  when the correlation coefficient is greater than 0.506 ( $N = 12$ ,  $N =$  number of statistic regions). Between the proportion of active sports clubs members and share in group diagnosis at the primary level was only significant negative relationship with respiratory diagnosis (MBK10-X), which means that more are active people in region lower is number of respiratory treatments. Among the variables of the funds of the municipality for each member of the sports club and share in diagnosis was negatively correlated with the diagnosis of infectious and parasitic diseases (MBK10-I) and positive with other symptoms, signs and abnormal findings non-assigned elsewhere (MBK10- XVIII). During an average wage per employee in the region, and its share of the diagnosis at the primary level has a high negative correlation with respiratory diagnosis (MBK10-X), diseases of the musculoskeletal system (MBK10-XII), gastrointestinal (MBK10-XI) and handling injuries, poisoning and consequences of external causes (MBK10-XIX). The reasons for these connections are very different but whatever the cause, the result shows that more the organized sports are

decreasing sickness (such as respiratory), the share of public funds per member sport societies reduce the sickness of infectious and parasitic disease, the greater the amount of wages per employee also has an impact on reducing respiratory diseases, musculoskeletal system, gastrointestinal diseases and addressing the consequences of injury and poisoning due to external causes. These results support the view of the sports clubs as a natural pharmacy and, with increased funding and highlighted by sports clubs would probably the Slovenian nation improve its health and save resources for treatment.

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**MARKET SURVEY TO DESIGN THE REBUILDING OF SPORTS  
FACILITIES IN NAPLES, ITALY**  
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Sports game court of Collana Sport Centre was closed by the local administration after structural accident. Technical study was made by local administration and it had determined the rebuilding of it because of the damages of the fundamental structures. Naples CONI have already designed an engineer project according to the parameters such as the characteristics of the old building. This design does not predict any changing of the architecture or different mode of utilization of sport facilities. It could be useful to find a new way to approach the question and to investigate the aspects that could help diagnosing the problem and the sport demand before designing a good engineering and architectural project. Collana used to have 3,000 customers per day before the structural accident and 2,200 after, so the number of customers of the sports game was around 800. The investors need to investigate customer choices of sports, the changes of choice in short or long term, the alternative proposal about the architecture according to the sports demand, the flexible disposition of tribunes for spectators of different sports game and for training. The used method is qualitative research through the questionnaire on a random sample of 100 customers. The main results show the association between demand of multiple and changeable choice of sports and long disposition with flexible disposition of telescope tribunes, the association between demand of single sport and stable disposition. Multiple sport demand is more frequent than the single one. The changes in sport choice are frequent and are in association to multiple sport choice. In conclusion, we suggest not to reproduce the architectural model of sports facilities but to deepen the study and the survey of the actual customer demand before design the rebuild. A market survey could be useful also for the design of new sports facilities and this is why it should be realized.

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## **CANONICAL RELATIONS BETWEEN BASIC KINETIC ELEMENTS AND MORPHOLOGICAL CHARACTERISTICS**

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The basic kinetic elements, with their quantitative and qualitative diversity, determine the kinetic structure, which is manifested in overcoming resistance on a particular path in a particular time. The kinetic structure in an individual or repeating motion partly also depends on the anthropometrical characteristics of the body, namely volume, mass, transversal and longitudinal dimensionality of the body. The main objective of this research is directed at determining the quality and the degree of correlation between basic kinetic elements with morphological characteristics. The research was conducted on a sample comprised out of 124, 15 year old, male respondents. A total of 21 kinetic measures obtained with the help of adequate instruments and with the use of the ergometrical method has been used for evaluating basic kinetic elements. For each motion, basic kinetic elements, namely resistance (kg), time of motion duration (s) and the amplitude or motion path (m) were isolated with the use of the kinesiometer. For the purpose of evaluating morphological characteristics in a way prescribed by the International Biological Program, 15 anthropometrical measures were utilized. The correlation between basic kinetic elements with morphological characteristics has been computed with a series of two canonical-correlative analyses – COCAIN. The canonical analysis revealed a very close correlation between the system of basic kinetic elements and the system of morphological characteristics. Due to a well-structured area, five significant canonical dimensions were successfully extracted. Generally, there are significant canonical relations between basic kinetic elements, namely resistance and amplitude in motion, with morphological characteristics. However, this is not the case with manifested reactions of time in motion. The determined correlation and relations of these areas are essentially rooted in basic biomechanical laws on the influence of the length of levers, angular speed and body mass, or the influence of body height on the efficiency of the functioning of the kinetic chain in relation to various functional mechanisms for the regulation of basic kinetic motions.

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## **FACTORIAL STRUCTURE OF BASIC KINETIC ELEMENTS**

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Quantitative and qualitative diversity of expressing basic kinetic elements in the kinetic structure is manifested in overcoming resistance on a certain path in certain time. Basic kinetic elements – time (s), amplitude (m) and resistance (kg), with their distribution and configuration determine the efficiency and type of the kinetic structure and enable the observation of those elements with other anthropological areas. The basic goal of this research is directed towards defining the latent structure of basic kinetic elements with the help of a specially prepared instrumentarium, with the use of the ergometrical method and on the basis of a factorial analysis of the elements of resistance, amplitude and time in individual and repeating motion. The quality and the degree of correlation between basic kinetic elements was determined and a factorial structure was obtained for 124, 15 year old, male respondents. Considering the type of research, this sample can be considered representative. A total of 21 kinetic measures, obtained with the use of instruments and the use of ergometrical method, were used for evaluating basic kinetic elements. Variables were chosen in such a way that they hypothetically cover basic kinetic elements in kinetic structures manifested in individual and repeating movement, defined as time dimensionality of the kinetic structure and tensodynamic dimensionality of the kinetic structure. For a better insight into the general behavior of analyzed variables, the methods of data processing were encompassed through calculation of regression analysis series, so as to determine the complex and the latent structure of basic kinetic elements (factorial analysis Little Jiffy, Mark IV was used). The analysis of the factorial structure of basic kinetic elements was carried out in a manifest area of variables. Six factors have been extracted on the basis of characteristic vales of the matrix of covariance of the analyzed space with the use of Guttman Kaiserov criterion. Isolated factors in this area have a phenomenological determination: a) latent dimension of pulling in kinetic structure (defined with resistance, amplitude and time in kinetic task – pulling), b) latent dimension of pressing in kinetic structure (defined with resistance, amplitude and time in kinetic task – pressing), c) latent dimension of repeating in kinetic structure (defined with resistance, amplitude and time in kinetic task – repeating), d) latent dimension of accumulating and releasing of energy in kinetic structure (defined with resistance, amplitude and time in kinetic task), e) latent dimension of generating and releasing energy in the kinetic structure (defined with resistance within kinetic tasks realized in individual movement), f) latent dimension of special determination of the kinetic structure (defined with the amplitude within kinetic tasks realized in individual movement). The latent structure of basic kinetic elements was analyzed. Latent kinetic dimensions were extracted



and interpreted as mechanisms for regulating intensity of excitation, a mechanism for regulating synergy and regulating muscle tone and integrative mechanisms for regulation, control and coordination of the mentioned regulative subsystems in the kinetic structure.

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## **DIFFERENCES IN LACTATE CONCENTRATION PARAMETERS IN 4X50M FREESTYLE ALL-OUT TEST BETWEEN MALE AND FEMALE YOUTH SWIMMERS**

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Lactic acid constitutes a useful tool for the determination of anaerobic capacity. Muscle lactic levels can increase to between 10-20 mmol/l during all out efforts. In order to determine maximum lactate accumulation, several middle distance tests are used. The most often used test for anaerobic capacity is 4x50m freestyle. The measurements of blood lactate concentrations have become a common practice for performance diagnosis and training control in competitive swimming. The rate of lactic acid production in muscle fibers depends on swimming speed, rate of oxygen consumption and type of muscle fiber. There is much interest concerning difference in blood lactate accumulation level in male and female swimmers. In this study participated 27 swimmers of competitive level (12 males and 15 female; Age - 15 to 17 yrs., BH - 171.0±8.7 cm, BM - 63.3±8.9 kg). The following variables were examined: The participants swam 4x50 meters freestyle with maximum intensity and 10 sec stop. Overall time performance in m/s (4x50\_v) and heart rate (HR) were measured right after the test. The maximal concentration of lactic acid ( $La_{max}$ ) and time to reach it ( $La_{max\_t}$ ) was determined by taking blood samples from the fingertip (by automatic analyser – Lactate Scout, Germany) in 3rd, 5th and 7th minute post exercise and analysed by polynomial mathematical modelling methods. The following two indexes was also calculated -  $La_{max}/4x50\_v$  index, and  $HR/La_{max}$  index, as a indirect measures of technical and energetic efficiency of swimming. The 4x50\_v performance velocity was 1.650±0.151 m/s for males and 1.476±0.054 m/s for females.  $La_{max}$  for males was 12.33±2.69 mmol/L and 13.17±3.74 for females, where  $La_{max\_t}$  was 247±75 and 272±87 sec, HR was 193.0±10.8 and 190.8±9.9 Beat/min for males and females, respectively. There was no statistically significant differences between gender at  $La_{max\_t}$  ( $t=-0.82$ ,  $p=0.210$ ),  $La_{max}$  ( $t=-0.68$ ,  $p=0.252$ ),  $La_{max}/4x50\_v$  index ( $t=1.68$ ,  $p=0.053$ ),  $HR/La_{max}$  index ( $t=0.31$ ,  $p=0.380$ ), and HR ( $t=0.55$ ,  $p=0.297$ ). Only statistically significant differences we found were at 4x50\_v ( $t=3.79$ ,  $p=0.001$ ). In case at tested sample of youth swimmers we didn't find statistically significant differences between gender at observed lactate concentration parameters at all-out 4x50m freestyle with 10 sec stop. Only differences we find at swimming velocities. It could be concluded that used test can be used as one of useful test for the evaluation of maximum capacity of anaero-

bic lactic mechanism in both genders. In further investigation we should do examination with different numbers of 4x50m sets and combination of stops according to lactate concentration parameters.

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## **BENEFITS OF PLAYING TOUCH IN SCHOOLS**

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Touch was first introduced in Australia in the early 1960s as a social game and used as a training and warm-up technique for rugby league. The first official Touch Tournament was held in Sydney in 1968 and then spread to New Zealand. Today there are more than 40 FIT (Federation of International Touch) member countries all over the world. Touch is developing very fast in Europe. Coaching and referee courses are held regularly every year all over Europe, enabling newcomers as well as experienced players to improve their practical skills and technical knowledge of the game. All member nations hold their national competitions and leagues. There is a special format of competitions designed specifically for schoolchildren, namely the World All Schools, alongside the Youth World Cup held for ages up to 20. Touch is the single sport that is played in mixed as well as male and female divisions at all levels. The non-contact sport will keep everyone involved and active during a PE lesson. Requiring three male and three female players on the field at all times of play, the mixed team game has a specific dynamic. Up to 14 players make up one team and during the two 20 minute halves of fast play, there is no limit to substitutions, so all players can be involved. The required skills are very basic – running, catching and passing the ball backwards. The rules are not too complex and the majority can master them within one hour of active play. Tactically a game of Touch can't be won by one person, rather, in order to score a touchdown, a lot of teamwork and especially communication is required. It is a great platform for improving communication skills. The game nurtures respect and consideration for each others' abilities, teamwork and spatial awareness. The onside and offside rule in defence ensures that no player is static during the game. Running forward in attack and running backwards and forward in defence in order to stay onside means players on the field will not have time to stand still. Teachers/coaches generally embrace Touch as an option to engage all pupils in one sport, regardless of the gender. Minimum equipment is required to play Touch. While it can be played indoors with a slight variation of rules making it an even faster game, it is mainly played outdoors. Cavendish Road high school in Brisbane, Australia, has an integrated Touch Excellence programme, in both New Zealand and Australia Touch is extensively played during PE lessons. Swiss school sports association have recently included Touch as one of the 32 sports in the annual national Schools competition, after a sport teachers' practical manual was produced in 2009. Sports teachers and schools are encouraged to undertake a module as part of their Physical Education curriculum. In Austria Touch is offered as a subject at University and in Hungary the process is underway to enable Sports Faculty

students to get credit points towards their diploma for taking Touch coaching courses.

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## **THE HEALTH CONDITION OF THE FIRST YEAR STUDENTS OF THE UNIVERSITY OF ZAGREB**

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Student population today is defined by current social events and is therefore facing great physical and mental demands caused by a sedentary way of living. The World Health Organization's researches show that inactivity and a sedentary way of life are some of the ten leading global causes of death and illness, and that physical activity contributes to the preservation and enhancement of health. The level of physical activity is changing throughout life, and increasingly drops at the time of schooling, especially in urban areas. Locomotive system problems, as well as other health problems, are rapidly increasing in the period of childhood and adolescence. The objective of this research is to subjectively evaluate the health of students at the University of Zagreb. This research includes 796 first-year students of both genders. The grading was provided by a questionnaire about health problems that consisted of multiple choice answers on a scale from 1 to 5 (from none to extreme). The arithmetical mean, standard deviation and t-test for independent samples are used. T-test shows statistically significant differences ( $p < .01$ ;  $p < .05$ ) between female and male students in the magnitude of the expressed problems and disorders. The most common health issues are: blood pressure, circulation, headaches, migraines, and lack of energy/constant fatigue. In the second place are the locomotive system problems and spine deformations. The results show increased level of student health problems and imply the importance of regular physical activity that allows young people to have very important physical, mental, emotional and social wellbeing. It also contributes to better mental health, increase of self-confidence and concentration as well as decrease of symptoms of depression, possible stress and anxiety.

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**SPORT CLUBS IN DISADVANTAGED NEIGHBOURHOODS  
AND THE PEDAGOGICAL COORDINATOR**  
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In the city of Rotterdam, experiments are going on facilitating sport clubs in disadvantaged neighbourhoods with a pedagogical coordinator. The goal of this intervention is establishing a sustainable pedagogical climate on these clubs. As a possible side-effect, it tries to strengthen parent's involvement at the clubs. It enables clubs to maintain social and behavioural rules, to observe problems with youth members and if necessary to channel these members to specialized organizations able to support or help them. A pilot at one club indicated positive results. Therefore, the experiment is now broadened to three sport clubs (two football, one base- and softball). The organization Rotterdam Sportsupport, which is responsible for the intervention, has asked the Verwey-Jonker Institute to assess the impact of the pedagogical coordinator. In the impact assessment study, we focus on the psycho-social health of the youth members of sport clubs and on the pedagogical climate. The design of the study is a trial: there are three experimental clubs and three control clubs. At all these clubs, we ask all parents of 8-14-year olds to fill in a survey. This survey contains the SDQ-questionnaire, a set of items to assess the pedagogical climate and questions to measure parent's involvement at the club. The survey has been held in may/june 2010, before the entrance of the pedagogical coordinator at the three clubs. The survey will be repeated after one and after two years, to assess the impact of the pedagogical coordinator. Furthermore, 11-14-year olds are also asked to participate in a survey, also at three moments in time. The youth questionnaire also contains the SDQ and the set of items measuring the pedagogical climate. In the paper, we will first go into the instrument of the pedagogical coordinator. Furthermore, we will present in detail the design of our impact assessment study. Finally, we will present the baseline measurement of our study. We now have about 275 parents about 200 youth members in the study. We will line out the psycho-social health of the youth members, the pedagogical climate and the parental involvement at the experimental and control clubs. We will also test the various scales we use in the study.



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## **EDUCATION AS A PROMOTER OF PHYSICAL ACTIVITY**

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Regular physical activity is an important issue since early age: the habits gained in childhood and youth have a lot of influence on the behaviour and the quality of living in adult life. In the promotion of a healthier approach to living, informing young people is of big importance. The research was done among student population in High educational systems, exploring their declarative knowledge on the subject, and showed insufficient level of knowledge in physical and health culture. The implementation of theoretical and practical education results in increased knowledge and active participation. The objective of this research was to determine the stance of the students towards the acquirement of theoretical knowledge in the area of PE. The research gathered 796 students of University of Zagreb. The results show the average, standard deviation and t-test for independent samples. 59.7% of students declared they only find exercising important, 36.8% wish to attend both lectures and exercises, and 3,4% wish to attend only lectures. Interestingly, 8% more of female students declared they wish to have lectures PE. Students were answering the questions concerning the areas they wish to know more about by filling out a multiple choice questionnaire with the spread of five given answers, all of different levels of value (from extremely unimportant to extremely important). The results show that students wish to know more about: proper performance of exercises and individual exercising throughout the life, healthy diet and decreasing body weight, the importance of exercising in preserving good health and illness prevention. The t-test showed the statistically significant difference ( $p < .01$ ) between the female and male students concerning certain areas. The research also showed that there is a interest and need of implementation of interdisciplinary, theoretical lectures in PE. The assumption is that it would also increase the interest and motivation for regular physical activity.

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## **"GOOD LADS PLAY FOOTBALL": THE PROCESS OF CIVILIZING ENGLISH FOOTBALL**

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Up until the end of the 1980s, English football (soccer) was hardly perceived as a source of English national pride. Principally seen as vulgar and violent, it was rather associated with the working class. In the wake of two tragic sports events (the Heysel and Hillsborough incidents in 1986 & 1989 respectively), significant political pressure called for the (western) 'civilization' (to use Norbert Elias' canonic term) of the English football's norms of conduct. The 'civilization process' in the English football can be described as a reform of the game's behavioral norms, in which new definitions of delicacy and refined behavior found expression, and slowly attenuated the disgust and shame of the game's previous incarnation. Interestingly, this 'new' structure of feelings and behavior, which had been socially encouraged since the beginning of the 1990's, was rapidly embraced by the rebellious working class men. Eventually, by the mid-nineties, English football had been reinvented as a civilized and western leisure activity, a source of pride for the British Empire. Today, the English football has many scenes in which what can be called 'civilized behavior' is performed. It has, however, one special sphere in which that behavior is actually being taught. This paper will focus on the teaching practices undertaken in this spirit in the academies of the Arsenal and Chelsea football clubs in London, England. Those academies, operating in England for the last decade, foster young gifted boys from ages 6 to 16, destined to become future professional football players. I will argue that while those academies' official aims are the training of young boys to become professional football players, they are also imprinting models for appropriate western, civilized behavior. The young trainees are encouraged to embody and perform an ideal model of the (western and civilized) 'English footballer': Playing fairly, showing respect and a gentleman-like behavior, and conduct a healthy lifestyle. Furthermore, "aristocratic philosophy" values find their way into the boy's training whenever the latter emphasizes aesthetics, elegance and a harmonious demeanor. In this paper I will show how this Ideal model is declared in the managers' syllabi, and how the trainers implement that construct in practice.

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## **SCHOOL AND SPORTS IN DUTCH DISADVANTAGED NEIGHBOURHOODS**

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Since The Netherlands has a tradition of sports in organized contexts, almost one third of her inhabitants participate in sports clubs. But only seven percent of the people living in Dutch disadvantaged neighbourhoods participate in a sports club. The reason for this is two-sided. First of all, the location of the sports clubs are moved outside of this neighbourhoods. Secondly, there are financial barriers. Most inhabitants of these neighbourhoods do not have, or do not want to spend, money on memberships of organizations. Children living in these areas often are labelled as youth at risk of social exclusion. Many studies conclude that sports participation is important for children's socialization and integration in society, especially for youth at risk. In order to get children in the age of 8 to 12 from these disadvantaged neighbourhoods involved in sports, Rotterdam Sportsupport initiated the school sports club. It is a way to engage youth in these neighbourhoods in society. In a nutshell, sports clubs and schools cooperate to organize structural training activities at schools and/or playgrounds in public space. So on, children can become members of sports clubs, train in their own neighbourhood and play matches on the club's location during the weekends. Members can use the Youth Sports Fund (Jeugdsportfonds) to tackle financial barriers for participating in sports. Researchers from the Verwey-Jonker Institute monitor and evaluate the intervention. In 2008, 2009 and 2010 we conducted an online questionnaire amongst pupils at participating schools, teachers from these schools, parents from children that are member of a school sports club, and trainers. All groups of respondents are very positive about the school sports clubs. Over the last three years the part of the children that participate in a school sports club increased (27% in 2008 to 43% in 2010). Membership of school sports clubs also positively affects the social networks of pupils. Teachers as well as the responding parents believe children's school results and behaviour at school improves because of partaking in the school sports clubs. The paper will first give a brief description of the school sports club and its background. Secondly, we will describe how we monitored and evaluated the results of the school sports clubs and describe the questionnaires. We have around 600 children, 100 parents, 50 trainers and 30 teachers responding every year. Results on the numbers of memberships and what respondents think of the effects of the school sports club will be shown in the third part of the paper. We will focus on school results and the neighbourhood effects.

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## **THE SPURT IN SKELETAL MATURATION DOES NOT EXPLAIN THE ADVANCES IN SKELETAL MATURATION IN ELITE YOUTH SOCCER PLAYERS**

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The aim of the present study was to investigate whether the advancement in biological maturation of youth soccer players depends on the maturation spurt or bias toward biological maturation in the selection process. To investigate these issues, we employed cross-sectional and mixed longitudinal study designs. Height, body mass, skeletal age (SA) and maturation differences in 181 youth soccer players (age range, 9.3–16.0 years) were measured. SA was assessed using Tanner–Whitehouse 3 (TW3) methods. Next, 37 of the 181 players participated in a 1-year follow-up study (age range, 9.6–13.0 years). Participants were divided into 7 categories [under 10 (U10)–U16]. Cross-sectional differences in measurements among these 7 categories were compared to the annual increment data. SA obtained using TW3 was significantly lower by 1.0–0.6 years than chronological age in U10 ( $p < 0.01$ ), U11 ( $p < 0.05$ ) and U12 ( $p < 0.05$ ) age categories. However in the U13 age category, SA was significantly higher by approximately 1 year compared to that obtained using CA ( $p < 0.01$ ). With regard to the annual increment in SA, TW3 ( $1.1 \pm 0.6$ ,  $1.1 \pm 0.6$ ,  $1.5 \pm 0.8$  and  $1.5 \pm 0.6$  years) showed no significant increments compared with CA ( $1.0 \pm 0.1$ ,  $0.9 \pm 0.1$ ,  $0.9 \pm 0.0$  and  $0.9 \pm 0.1$  years) except in U15 ( $p < 0.05$ ). For U12 and U13 in particular, cross-sectional differences in SA (2.6 years) was greater than the annual increment value (1.0 years and 1.5 years, respectively). Participants in U12 and U13 were 5.9 ( $p < 0.05$ ) and 14.9 ( $p < 0.01$ ) cm taller than those in U11 and U12, respectively. In mixed longitudinal data, height increased significantly from 12 to 13 years of age ( $10.9 \pm 3.3$  cm) compared to 10 to 11 ( $5.4 \pm 1.2$  cm), 11 to 12 ( $6.4 \pm 1.6$  cm) and 13 to 14 ( $6.2 \pm 2.3$  cm) years of age. For U12 and U13, the cross-sectional difference (14.9 cm) was 4.0 cm greater than the annual increment value (10.9 cm). With regard to body mass, significant inter-age differences were observed between U12 and U13 (12.7 kg,  $p < 0.01$ ) and between U14 and U15 (8.3 kg,  $p < 0.01$ ). However, the annual increment in body mass did not differ among all age categories (10–11 years,  $5.3 \pm 2.5$  kg; 11–12 years,  $4.5 \pm 2.1$  kg; 12–13 years,  $8.2 \pm 3.1$  kg; 13–14 years,  $4.8 \pm 3.3$  kg). Our finding suggests that the spurt in skeletal maturation does not explain the advances in skeletal maturation identified in elite youth soccer players. In other words, there may be bias toward physical and biological advancement in the talent selection process. Coaches should therefore have an understanding of biological maturation of adolescent soccer players when estimating their physical improvement.



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## **FACTOR STRUCTURE OF MOTOR ABILITIES OF 6.5-YEAR-OLD BOYS AND GIRLS**

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Taking into consideration the current theoretical knowledge as well as the experiences acquired through practical work with pre-school children, it can be concluded that the structure of latent motor ability dimensions differ a lot both among school children and adults. Unfortunately, the knowledge of latent motor ability dimensions of pre-school children is still insufficient, which can primarily be attributed to development features, as well as to the specific ways of working with this particular population. The aim of this paper is to contribute to a better definition of latent motor ability structure of both boys and girls. The sample contained of 106 6.5-year-old boys and 121 girls, tested with a batch of 18 composite tests for evaluation of six hypothetical latent motor dimensions, three for each of them (coordination, flexibility, power, agility, accuracy and balance). Having performed the rotation of initial coordinate system according to Varimax criterion six factors extracted among boys were defined as: general motor ability factor, coordination, balance, undefined factor x, undefined factor y, flexibility. The total of 65% of latent space variance was explained. 64% of variance was explained for girls. Latent motor ability structure consists of seven factors as follows: general motor ability factor, coordination, balance, undefined factor x, undefined factor y, accuracy and undefined factor z. From everything above mentioned it can be seen that the latent structure of boys and girls differs according to the number of extracted factors and their possible interpretation. This research confirms that in this period of development certain latent dimensions were defined, but they can be expected to a greater extent among school children. It was also confirmed that the latent dimension structure of the children of this age also varies according to gender.

**Notes:**

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## **PARENTS ROLE IN SPORTS: SPORT PSYCHOLOGY WORKSHOP FOR PARENTS, COACHES, AND ATHLETES**

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The role of the parents in sport is becoming more and more important- they are not just parents, they are getting involved in sport, they are very interested in a theory of sports and can find all kinds of knowledge and information on training and competition. Between the coach, athlete and parents the connection is strong and special. Usually the relationship between athlete and his coach is clear and well known. But often coaches do not know what to do with parents. The easiest way out is, to remove parents from the sporting arena. So it happens that parents don't get enough information and the coach feels as they are interfering with his work too much. This leads to tension and conflicts and bad moods on both sides. Our role defines the way we behave and this means, that when we imagine a father or a mother, we expect certain behaviour. It often happens that we picture these roles differently. Because we came from different backgrounds, societies, these differences are usually very big. And in sport field people are coming from all kinds of societies and backgrounds. I will present a workshop I have designed for participants in the sport process (young athletes, coaches and parents). The workshop is designed according to the U.S. program for parents of tennis players, authors are sports psychologist Smoll and Loehr. Workshop consists of a 4 meetings. a) At a first meeting participants talk about their sport, what benefits they see in sport and answer some questions like: What is role? How do I see my role in sports and how can I become a member of a team in a sport triangle (athlete- coach- parent)? b) Second meeting is only for parents. We discuss role of a parent in sport and make a poster about these roles. Then we talk about how we communicate - talking in a positive way and active listening. We practice active listening and recognizing most common nonverbal signs. c) Third meeting is for athletes. We describe the role of an athlete, how they see their sport and what they expect from their coaches and parents. d) At fourth meeting we are all together again. We present our posters and make agreements. In family pairs we practice active listening and try to make some agreements how we will play our sporting part in the future.

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## **SPEED, AGILITY AND EXPLOSIVE STRENGTH AS COMPONENTS OF JAZZ BALLET DANCERS' TRAINING PROCESS**

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As a priority in the creating and programming training process, it is necessary to know the motor skills that have the greatest influence in achieving better results, and for whose development it should take more time for training. The aim of this study was to determine the interrelationship of motor abilities speed, agility and explosive power at Jazz-ballet dancers. The sample consisted of the 21 Jazz-ballet dancer ages 12-15 years. The level of motor ability of the dancers was determined via the application of a set of 9 standardized motor tests for explosive strength. To process the data, we used the statistics package SPSS 11.0 for Windows. The ratio between explosive strength, speed and agility determined by the application of correlation. On the basis of the results that we got, and the very high degree of correlation, obtained in the tests that individually represented motor abilities, it can be concluded that they have a feature in common which tell us that the used tests realistically assess the motor space they were used for. High correlation between the speed test – Running at 20 m and Running at 40 m ( .742 ), and the test for agility –T-test, Envelope-test and Sixangular direction-test ( .819 and .700 ) confirm the thesis that agility is a complex motor ability, and that speed is one of its segments. The explosive strength variable, the Surgeon-test is related to the explosive strength variables: throwing the medical ball from the lying position (0.684), Longitudinal jump from the spot (0.716) and Triple jump from the spot (0.625), and the agility T-test variable (0.572), and the speed variable Running at 40m (0.564) at the significance level of  $p \leq 0.01$ . There is also correlation with the variables of Running at 20m ( 0.473), and the Envelope-test (0.525) but at the significance level of  $p \leq 0.05$ . It can be concluded that these three motor skills are high-associated and in the process of programming and planning training processes of Jazz-ballet dancers it should be used more moving activities that improves all three motor skills. These results cannot be generalized, but they can be guidelines in improving the training process of Jazz-ballet dancers.

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## **COMPETITIVE STATE ANXIETY AND SUCCESS OF YOUNG ORIENTEERS**

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Competitive state anxiety level is an indicator of physiological and psychological excitation athletes before the competition. Competitive state anxiety is situational specific multidimensional construct consisting of three components: somatic anxiety, cognitive anxiety and self-confidence. Orienteering is a highly demanding sport, in terms of cognitive abilities, and it is understandable to expect that a high level of competitive anxiety can have negative consequences on the quality of the competitive performance of athletes, because it violates his attention and concentration, thinking and decision making processes. The aim of this study was to determine whether there was a correlation between the level of competitive state anxiety before competition and performance in the competition and also which component of state anxiety is the best predictor of success. Competitive State Anxiety Inventory (CSAI-2) was conducted on a sample of 54 young athletes, 27 male and 27 female with an average age of 13 years and average experience in orienteering than 3 years on two orienteering events of national level, 20 to 30 minutes before the start. The results showed that there was a correlation between all three components of competitive state anxiety and performance in orienteering. Correlation between competitive achievement and cognitive and somatic anxiety was statistically significant and negative ( $r = -.417$ ,  $p < 0.01$ ;  $r = -.397$ ,  $p < 0.01$ ), and with confidence positive, but not statistically significant ( $r = .182$ ,  $p > 0.05$ ). These results, as well as the results of further regression analysis, have entirely confirmed our expectations that the high cognitive anxiety (fear of possible failure, error, poor performance, loss of concentration, failure to reach goals, others' negative assessment, etc.) is the best and most reliable predictor of poor competitive performance in orienteering, because it is the only factor that explains almost total amount of variance of achieved competitive results (15.8%). Future researches on larger samples of athletes need to investigate if the gender differences in level of all three components of competitive state anxiety of orienteer, especially in the amount of cognitive anxiety, which most affects the quality of their performance, are random, or specific product of a complex interaction of psychological profile of women and competitive nature of orienteering as a sport.



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## **EXCUSING FROM PHYSICAL EDUCATION IN THE SECONDARY-SCHOOL SPORT CLASSES**

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The purpose of this research was to establish the differences between students, enrolled in special sports classes and students in regular classes in secondary schools, regarding their excusing from physical education lessons. The used questionnaire examines the frequency of excuses, the reasons for genuine and invented excuses and the activities that students carry out when they are excused from active participation in physical education lessons. The sample included 560 secondary students, consisting of 210 students, enrolled in sports classes and 350 students in regular classes. The significance of stratification variables (type of class, year of schooling, gender, overall school success) for the explanation of frequency of excusing from physical education lessons was established by ordinal regression analysis and logit function. The most significant individual factors of frequency of excusing from physical education lessons are gender and year of schooling; girls and students in their final year of their schooling have the most options for excusing. Special sport classes have no statistically significant odds ratio for excusing. Median value of students' absence in sport classes is between "1 to 5" and "6 to 10" hours per year, respectively, which is higher than among male students in regular classes but lower than among female students in regular classes. Being excused from physical education lessons does not depend on the sports discipline of students from sports classes, nor does it depend on the volume of training and the level of success in chosen sport. It depends only on gender. Male students have more odds ratio for frequent excusing. The most frequent actual reasons for excusing are injuries, illness and studying for another subject. When excused from lessons, students in sport classes most often watch the lesson or study another subject like their peers in regular classes. The system of excusing from lessons is too lenient; teachers also do not provide activities to students during the time of being excused. As injuries and overload of sports activity are an important reason for students in sports classes for being excused from lessons, it is suggested that these students be monitored by a school physician.

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**COMMERCIALIZATION OF YOUTH SPORT FROM THE  
PERSPECTIVE OF SPONSORS' INTERESTS IN SLOVENIA**

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Sponsorship for companies represents an investment that will result in commercial effects. Such approach has also impact on youth sport, especially on international mobility of most talented players in most commercial sports toward professional leagues. Therefore the purpose of this study was to examine the commercialization of Slovenian youth sport from the perspective of sponsorship potential of Slovenian sport. The sample of measured subjects was a total of 494 potential sponsors/managers of Slovenian companies. A questionnaire was used to examine which sports disciplines are the most interesting for sponsorship. The results of the study revealed that the companies are interested in sponsoring Slovenian sport; however, the range of sports disciplines that interests sponsors is relatively small. Therefore commercialization potential of youth sport in Slovenia is very limited. The most interesting sports for sponsors are basketball, football, alpine skiing, ski jumping and handball. Compared to previous findings, an increase of the interest for football and a decrease for alpine skiing has been noticed. Study was conducted before global economic crises; therefore some important issues have to be considered. One of these is undoubtedly the opportunity for reasonable de-professionalization of youth sport.

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## **THE INFLUENCE OF FLEXIBILITY TRAINING PERFORMED AT THE FINAL PART OF PHYSICAL EDUCATION LESSONS**

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Flexibility is believed to be an important element of fitness and health of the musculo-skeletal system (Corbin, & Noble, 1980). However, this important motor ability is often neglected in everyday life. Indeed, the latest data shows that in Slovenian region Zasavje the decline of flexibility of pupils in primary school is especially evident over the past twenty years. The teachers of physical education in primary school Šmartno pri Litiji are aware of this problem; therefore flexibility exercises are included in the physical education lessons. However, due to our experiences, pupils do not like very much such exercise. Therefore, the purpose of this study was to determine whether minimal amount of flexibility training with ballistics stretching improves flexibility in children. Subjects were 52 children (23 girls and 29 boys) between 9 to 10 years of age. The subjects were divided into two groups: experimental group (E) with 35 subjects and control group (C) with 17 subjects. After the initial testing, the E group was given the complex of flexibility-ballistics exercises for improving flexibility of the shoulder, low back and hip joint. These flexibility trainings lasted five minutes during the final parts of the physical education lessons. The subjects performed it three times per week for three months. During this period, the C group had usual lessons, without additional flexibility exercises. The identical testing protocol was used to evaluate pre- and post- training conditions. It included four anthropometric measurements and three measurements of flexibility (the shoulder-wrist test, the stand and reach test and the standing leg abduction test). As expected, the E group significantly increased range of motion in all three flexibility test with the training ( $p < 0.01$ ). There was significant improvement in flexibility of the hip joint at the C group during the experimental period ( $p < 0.01$ ). Furthermore, there were significant different training effects between both groups on the flexibility of the low back ( $p < 0.01$ ). Considering the result of present study, it could be concluded that even minimal amount of ballistics exercises performed three times per week for three months has significant effects on the children's flexibility of the low back.

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**MORPHOLOGICAL AND PHYSICAL FITNESS DIFFERENCES  
BETWEEN GROUPS OF 12 YEARS OLD MALE MACEDONIAN  
PUPILS WITH DIFFERENT LEVELS OF CARDIO  
RESPIRATORY ENDURANCE**  
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The aim of this study is determination of influence of certain morphological and physical fitness manifestations on cardio-respiratory endurance level in 12 years old male Macedonian pupils. The main sample contains 186 male schoolchildren aged 12 years (+/- 6 months) from 15 primary schools from all urban and rural regions in the Republic of Macedonia. The cardio respiratory endurance level was estimated with multistage 20 meters shuttle run test (20SRT). The morphological measures, triceps skin fold thickness, body height and body weight and body mass index (BMI) as well as five motor tests from EUROFIT program for children were used in this study. For the prediction of functional strength (arm and shoulder muscular endurance) was used test bent arm hang. For the prediction of trunk strength (abdominal muscular endurance) was used test sit-ups. Standing broad jump test was used for the prediction of power ability (explosive strength), the shuttle run 10x5 meters test for the prediction of running speed agility, and hand-grip dynamometry for the prediction of static arm (absolute) strength. The inter-group differences, obtained with statistical method ANOVA, in all analyzed morphological and motor variables, were established between maximum distinct groups (N) with under average (58), average (80), and above average (48) level of success in the 20SRT test. The groups were defined with cluster analysis (k-means clustering). The obtained results of the study show significant inter-groups differences ( $F( df1,2) 2,174$ ;  $p\text{-level}<0.05$ ) in all analyzed variables, except in variables body height ( $F=1.700$ ;  $p\text{-level}=.186$ ) and handgrip dynamometry ( $F=.504$ ;  $p\text{-level}=.605$ ). The results show that better level of cardio-respiratory endurance generates higher level in analyzed components of physical fitness and lower level of fat body mass. The findings are in accordance with results from other studies as well as with our previous findings from the same data which show that in this period of adolescence the analyzed components of physical fitness, including cardio-respiratory endurance are positively interdependent, and at the same time are significantly influenced by level of triceps skin fold thickness and BMI.



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## **MODEL OF PREPARATION OF THE NATIONAL PROGRAMME FOR SPORT 2011–2020**

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The last National programme for sport has been prepared for the 2000–2010 strategic period and as such it will run its course at the end of 2010. In line with directives of the Ministry of education and sport, before the end of validity of existing National programme for sport, »Project of preparation of the National programme for sport for 2011–2020« and the »Project of preparation of the amendments or preparation of the new Law on sport« have to be carried out. Slovenian Minister of education and sport, Igor Lukšič PhD, has named Marko Rajšter – general director of the Directorate for sport – as a project manager for preparation of these two documents. On the basis of recommendations from the Ministry of education and sport, Slovenian Olympic Committee – Association of Sports Unions and the Faculty of sport, the Minister has named a project team for realisation of both strategic documents. Documents should be finished and passed in the Slovenian National Assembly by the end of 2010. Methodological starting-point for preparation of the new National programme for sport for 2011–2020, which could become a fundamental strategic document for progress and development of Slovenian sport in the coming decade, was based on the methodology of strategic management, which recommends a series of steps in preparation of such documents. A project team has prepared a proposal for the new National programme for sport for 2011–2020, which will have to undergo a long path of changes and amendments until it will be passed in the Slovenian Parliament. When preparing the proposal, project team members have on the basis of available data and heterogeneous knowledge as well as familiarity with various segments of sport attempted to tackle sport in its entirety. A preliminary presentation of the proposal has been completed in front of all the committees of Slovenian Olympic Committee – Association of Sport Unions, which is the highest professional organisation from non-governmental sector in sport, in front of students of the Faculty of sport, which are potential users and creators of future image of sport, and also at 14 regional symposiums across the entire Slovenia. Responses of all types of public were critical but encouraging.

**Notes:**

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## **CHILDREN WITH LOWER MOTOR COMPETENCY DURING THE EARLY YEARS OF EDUCATION**

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The study examined children with lower motor competency, attending first four years of primary school. Sample of measured subjects included approximately 53% of children from a cohort of primary school children who attended Year 1 in 2005/2006 academic year and for whom data from the measurements with SLOfit system were available for all four years of education. As a result, subjects were measured in April of every year; namely, in 2006 in Year 1, in 2007 in Year 2, in 2008 in Year 3 and in 2009 in Year 4 of primary school. Sample included 4,970 boys and 4,611 girls. Within the sample, as children with lower motor competency were considered those with the average T-values of all eight motor tests (XT) of 45 or less; they represented approximately 20% of population. It has been revealed that during the studied period, these children were physically least efficient in Year 4. Half of them were overweight (IOTF standards were used for calculation of BMI) and this proportion has been increasing throughout the four year period. They had the largest problems with fast movements of body mass, global coordination and extended duration of aerobic type of movement. It is recommended for these children to be included into additional in-school hours of physical education with specially designed programme. Schools should encourage parents of these children to cooperate. Teachers should be careful in realisation of programme in order to prevent injuries in knee or ankle joint when executing fast and powerful movements due to excessive body mass.

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## **NANOPSYCHOLOGICAL APPROACH TOWARDS YOUTH SPORTS**

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Communicational and communication skills of young people to express their psychological state are decreasing in adolescent age. Reduction of those could lead to psychosomatisation vs. verbalisation. Destructive mobilisation of energy (DME) becomes deconstructive in youths' everyday life, as well as in sport they practice. On the other hand constructive verbalisation enables adolescent to overcome intensive psychological changes that appear in this life period. DME can cause psychological fixation and enables accessory to socio-psycho-pathological expressions. (Youth) sport does not use psychological characteristics which are common to sport and vice versa. Psychology could use a lot of sport characteristics in its own field of work. The beneficial effect of sport in general is a common knowledge. It is known that some physical exercises can prevent or improve psychological well-being. But specific linkage between motive abilities and psychological status of sportsman, especially young ones, which could be planned, developed and systematically applied, is not known so far. Further we establish both-way linkage between seven basic movement abilities and its psychological equivalent. Endurance and persistence, speed and learning/memory, flexibility and flexibility/adaptation, power/strength and determination, balance and personal hardiness, precision and personal accuracy/punctuality, coordination and intelligence, integrated physical realization and self-believe/self-confidence are combined to enhance each one of them according to the needs of young included. Both-way linkage enables us to use sport-movement abilities as their psychological equivalent for diagnosis or reparation / re-learning phase in order to improve psychological or specific motor abilities, depends where the problem appears to be. It is very important to take into consideration developmental (psychological and motive) characteristics of the young and sport specialities they are into. The innovative theory, methods and techniques are developed, using typical developmental motive exercises (TDME) for reparation or re-learning of fixation of some psychological characteristics that have great influence on sport performance. Nanopsychology is an expression for applied psychological discipline with innovative theory, methods and techniques which integratively overbuild cognition of depth psychology, psychotherapy and kinesiology. Taking into consideration different levels of youth sport, like everyday sport of youth, sport of the youth in schools and competitive sport of the youth, at least the last two has a great deal of needs and possibilities to overcome sport potential. Hence sport potential is far greater than just physical one. Using TDME can successfully improve specific psychological traits of young sportsmen in sport and vice versa, influent on specific psychological traits

can improve specific movement abilities or integrated physical realization. Finding of nanopsychology could be systematically applied in different sections of the youth sport or even combined with other aspects of peoples' everyday life.

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## **HORMONAL RESPONSE TO SPECIFIC SPEED ENDURANCE TRAINING SESSION IN SLOVAK ELITE YOUNG FEMALE SPRINTERS**

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The purpose of this study was to investigate relationship between specific speed endurance training, lactate production and acute hormonal response in female sprinters. Speed endurance training has got a very important place in sprinters training. Extensive speed endurance training is very often used in adolescent sprinters preparation, which can cause general overload and stagnation process in adult categories. Biochemical monitoring has to be considered as a part of training monitoring for studying the effectiveness of training and possible overload of the athletes. Hormonal studies also provide information on the adaptation to some levels of exercise intensity and duration and can be used for the assessment of the trainable effect of the training session and control of the recovery period. Equilibrium between anabolic and catabolic states in athletes is often represented by the ratio of the testosterone-to cortisol ratio (T/C). T/C has been suggested as a potential marker for insufficient recovery. 9 top Slovakian young female sprinters performed speed endurance test 3x3x60m (rest between repetition 2 min., rest between sets 5 min.) in standard conditions. Intensity for 60m run was calculated in 90%-95% of the best time over 60m performed in the same day. Blood sample was taken at 9.00 am before testing; second blood sample was taken within 30 min. after the exercise was completed. Serum levels of testosterone (nmol/l) and plasma level of cortisol (nmol/l) were determined by RIA. Blood lactate level from the finger was taken 3min and 20 min after the last repetition was completed. Blood sample was analyzed with the lactate measurement device ACUTREND®. Testosterone has been taken as an anabolic indicator and level of cortisol reflects total training stress to athlete's organism. Testosterone/cortisol ratio decreased after the training session in all athletes, which show us that performed training session had a highly stressful impact on the athletes. Average level of lactate 3 min. after the exercise was 15.3 mmol/l  $\pm$  3.5, 20 min. after the exercise 7.71 mmol/l  $\pm$  3.2. The difference between the testing of first and second sample and how fast the blood lactate level decreases is an indicator of specific adaptation to a specific training session. T/C ratio and blood lactate level showed us that, Slovak elite young sprinters are missing a right amount of training sessions specified for speed endurance development.



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## **PHYSICAL SELF-CONCEPT OF NORMAL WEIGHT AND OVERWEIGHT ADOLESCENTS**

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In recent years, the prevalence of overweight and obesity in children and adolescents has increasingly spread worldwide and is one of the most significant public health challenges. Earlier researches stress the importance of relation between children's and adolescent's physical self-concept and body mass. However, those relations are not clearly specified with respect to gender. The aim of the study is to explore physical self-concept of normal weight and overweight Serbian adolescents and differences in physical self-concept within and between gender groups. The sample consisted of 417 primary school students (229 boys and 188 girls), average age 13.6 years. Anthropometric characteristics (height and weight) were measured and body mass index (BMI) was calculated. For assessment of multidimensional physical self-concept, Physical Self-Description Questionnaire (PSDQ) was used. T-test analysis shows that overweight adolescents have significantly lower scores than normal weight on all PSDQ scales, except on Health and Strength. These differences are larger within the group of girls. Results show that overweight boys score lower on only 4 scales of PSDQ (Body fat, Sports competence, Endurance and Appearance), in comparison to normal weight boys. In the female group overweight girls score lower on 7 PSDQ scales (Coordination, Body fat, Sport competence, General physical self-concept, Flexibility, Endurance, and Physical activity), while on scales Health, Appearance, Strength and Self-esteem there are no significant differences in comparison to normal weight girls. Research confirms that overweight adolescents have poorer physical self-concept. For better understanding of relation between physical self-concept and body mass it is necessary to take into account gender. Results are potentially valuable for development of physical education school programmes and for prevention of overweight and obesity problems.

**Notes:**

[illegible]

## **DISEASES AND CHRONIC INJURIES AMONG SLOVENIAN PE TEACHERS**

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Specific working environment of physical education (PE) teachers may cause several diseases, acute injuries and chronic disorders. Frequency of diseases and chronic disorders and their association with gender, age, years of teaching experience and school levels (primary, secondary) were studied by a questionnaire sent to all Slovenian PE teachers in 2005. Self-selected sample consists of 468 (60% male, 40% female) PE teachers from primary (63%) and secondary (37%) schools with mean age of 43 ( $s=9$ ) and mean years of teaching experience of 18 ( $s=10$ ) years. Teachers were asked to allege fifteen presumably most common medical problems on a four-level scale (0=never, 1=rarely (periodically, occasionally), 2=often, 3=very often) with possibility to mention two additional problems they experienced in their professional career. Lower back pain, dysphonia and cold were most common health problems, followed by headaches, auditory problems and ankle disorders. Joint disorders (except for hip) were more frequent in males, while most of other health problems, especially voice problems (dysphonia, aphonia), headaches, and urinary inflammation, were more frequent in females. After controlling for gender, age and years of experience, health problems, especially lower back pain, voice problems, ankle and wrist disorders, were more frequent among PE teachers from primary than from secondary schools. Older teachers with many years of teaching experience reported substantially more auditory problems, neck and lower back pain and joint disorders, especially in shoulder and elbow. The results call for action, particularly for those groups found most vulnerable and for those medical problems (e.g. dysphonia) where even small changes in teaching environment may bring the most benefit.

**Notes:**

[illegible]

## **URBAN YOUTH EXERCISE GROUPS?**

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Contemporary society is dominated by urban survival patterns. In this regard, two thematic issues have not been sufficiently defined. The first relates to the designation (occupancy and usability) of public space and the second to open air pastime activities. It is well-known that urban space is occupied predominantly by traffic and shopping malls. Sidewalks and platforms are targeted by owners of restaurants and bars, advertisers and other crafty people, while there is always a lack of parks and playgrounds to sufficiently satisfy the human phylogenetic need for dwelling/moving/socializing in the open air. Although by law public space is intended for everybody, its functional usability depends on the boldness of its beneficiaries. Contemporary, gerontocratic civilisation is the least appreciative of youth which thus becomes the most endangered category of liveliness despite being the principle foundation of human survival. The ideology of longevity introduces unrecoverable deviations into the liveliness curve, leaving the most visible traces on the human attitude towards living space, i.e. the broad space of nature as well as the narrow (urban) space of survival. By longing for eternal youth man has achieved eternal old age. According to the above, each formal educational process starts with the imposition of aging. Informal, self-organised groups of young people are therefore desirable, more or less autonomous zones of liveliness and self-education. This is the most authentic form of the functioning of civil society protecting people from the predominance of formal interpersonal relationships. By analysing urban youth exercise groups, the article discusses certain key characteristics of the functioning of urban space, opens up additional thematic issues and substantiates the importance of sports culture for the urban environment, i.e. aims to raise interest in the topic of informal urban sports and arts practices which are typical of young people.

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## **SOME CHARACTERISTICS OF THE USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) IN WORK OF PHYSICAL EDUCATION TEACHERS**

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Information and communications technology (ICT) includes all modern technology – computer, camera and other equipment in lessons – has become an irreplaceable accessory for physical education teachers when presenting learning contents with multimedia support. »ICT literacy« is one of the basic working competencies of modern teachers. As such, projects e-schooling and e-competent teachers have been carried out by the Slovenian Ministry of education and sport. According to the specifics of physical education teachers' lessons and in order to teach motor skills via demonstration and by providing feedback information about the correct execution of movement, teachers could present a variety of contents (both practical and theoretical) with the help of multimedia ICT. In this way, a »new-modern teaching dimension« would be added on all levels of teaching process (presenting of new contents, practicing skills, evaluation and marking). The purpose of the study was to discover the level of e-competency of physical education teachers and to find out basic characteristics of the use of ICT in teaching. The sample of measured subjects is represented with 201 randomly selected interviewees from 100 different schools, who have filled in a questionnaire at the professional meetings of sports pedagogues in the 2009/2010 academic year. The sample consisted of 100 men and 101 women. The sample of variables is represented with the questionnaire on the use of ICT, which included open- and closed-type questions. Data were processed with the Excel 2007 and SPSS 17.0 programs. We used descriptive analysis and analysis of variance. The majority of interviewed subjects have been involved in education process for more than 20 years (41.3%), most of them have finished university degree (79.1%) and 7% of them also had PhD or masters degree. 48.3% of measured subjects had a title adviser, 31.3% a title mentor, 7.5% a title councillor, whereas 12.9% of interviewed subjects did not possess any additional title. Data revealed that the majority of measured subjects (92%) use computer and internet at work; they are also the most commonly used ICT media. 78.6% of all measured subjects use them every day. Interviewed subjects most often use internet in order to read their e-mails and to a great extent also to acquire information from professional and other web sites as well as to acquire fascinating information for more interesting pedagogic work. Teachers most often use internet (94.5%), programmes such as Word and Excel (93%), photos, pictures and drawings acquired from the internet (93%), digital camera and camcorder (88.6%). More than 75% of teachers use laptop in physical education lessons. Teachers least often use energy consumption monitors (20.4%), inter-



active whiteboards (22.4%) and weblogs – blogs (30.8%). Data showed that schools are well equipped with basic ICT equipment (stationary and portable computers, access to internet, digital cameras and camcorders) and slightly less with specific equipment, such as interactive whiteboards, heart rate monitors and energy consumption monitors. Analysis of variance revealed that younger teachers in the urban environment significantly greater use ICT, such as older and those living in rural areas. It has been found that the majority of interviewed subjects in schools have adequate basic conditions for teaching; however, the use of ICT in physical education is not on a high enough level. In future, systemic measures should be used in order to improve e-competency of teachers.

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## **RELIABILITY AND VALIDITY OF A TEST BATTERY IN A SCHOLAR POPULATION**

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Many studies have examined the development of the motor skills during the evolutive age. So far, conditional tests have been mainly considered, while there is a lack of information about coordinative capabilities tests. The aim of this study was to assess the reliability and validity of a battery of motor tests commonly used to evaluate children and adolescent people. 478 subjects aged 11 to 14 yrs (M:236; F: 242) performed six motor skills test: dynamic balance test on a square beam (DBT), 10-m dash sprint (DS), standing long jump (SLJ), throwing of the basketball ball to assess explosive strength of upper limbs (SBT), sit and reach flexibility test (SRC), handgrip (HG), body height (BH) and weight (BW) were also measured. The reliability was studied with the test-retest method, calculating the Pearson's  $r$  correlation coefficient between trials of the same test. To assess the structural validity, hierarchical cluster analysis and a factor analysis (with MCA and VARIMAX rotation) were performed with the SPSS Software. Four tests (DS, SLJ, SRC, SBT) showed a very good test-retest correlation ( $r > 0.90$ ). Good correlation was observed for the HG ( $r = 0.83$ ) and the DBT ( $r = 0.76$ ). Separate analysis were conducted on subsamples divided by gender and age (11-12 yrs and 13-14 yrs), obtaining results similar to those observed in the aggregate sample. Hierarchical cluster analysis showed a first group of tests including HG, SBT together with BH and BW. The SLJ and DS tests were highly related to each other and in a weaker way with the previous variables. Conversely, independence between the SRC and DBT and the other tests were observed. Factor analysis revealed three factors, explaining about 76% of the total variability. In the first factor (36% of var), anthropometric data, HG and DBT are highly saturated. In the second factor (27% var), the SLJ and DS are the most saturated variables. 13% of variability is explained by the third factor, correlated mostly to DBT and HG. The reliability of tests, assessed on a scholar population, showed good to very good levels. The structural validity analyses showed that the upper limb strength test is strictly related with BH and BW and then with the physical development of the boys. Strength tests involving a body displacement are instead less related to anthropometric characteristics. Coordinative tests as SRC and DBT are independent from both the strength tests and the physical development.

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**DRUG-TAKING AND SPORT ACTIVITIES AMONG 14 YEAR  
SCHOOL PUPILS IN SLOVENIA**

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Sport activities represent an important factor in preventing drug-taking. Most people begin taking drugs in their youth and become addicted easily. Therefore, it is important to offer young people a number of various healthy activities, among which sports activities undoubtedly belong to as well. The aim of this research was to establish whether there is a correlation between sport activity and drug-taking among 14-year-old pupils in Slovenia. We used a questionnaire of 38 variables on sport activities and drugs. The probability relations among the variables have been tested by the Chi-square. We have ascertained that there is some statistically significant correlation between sport activities and taking licit and illicit drugs. A statistically characteristic correlation was observed with drinking alcohol with male pupils and inhaling vapours with female pupils. We also observed significant correlation between organized sport as the type of sport and drug use. Our results indicated differences in alcohol use between participants who participate in organized sports.

**Notes:**

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## **DIFFERENCES IN PERCEPTION OF CHILDREN RIGHTS BETWEEN YOUNG ATHLETES AND THEIR COACHES**

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Sport offers a child an opportunity for physical, social and psychological development, but also has a nurturing effect. According to the UN convention, all children have rights to develop in all aspects of life: physical, emotional, psychosocial, cognitive and cultural. Children are not small adults and the sport environment has to be adjusted to their specific needs and capacities. To fulfil that mission it is important to know how young athletes and their coaches perceive sport environment regarding children rights. The aim is to investigate how young athletes and their coaches perceive children in general and to compare their perception of children rights. The sample was comprised of 79 young athletes ( $M=12.9$  yr.) and 10 coaches ( $M=27.2$  yr.) from 4 different sports, both sexes were represented. Children rights were investigated by questionnaire constructed for this study based on 2 instruments. The results showed that term 'child' was perceived similarly by coaches and children, only in positive way. The exceptions were the attributes 'interesting' ( $t=10.498$ ,  $df=76$ ,  $p<.000$ ) and 'warm' ( $t=4.140$ ,  $df=76$ ,  $p<.008$ ), perceived more positively by coaches than by athletes. Most children were familiar with their rights, and those information collected from printed material, less from TV, while coaches used both sources equally. 92% of investigated athletes think that children have to be informed about rights, 65% of them can quote some. All coaches think that children must be informed about their rights, but only 50% of them can quote some. The athletes, especially older once ( $\chi^2 = 5$ ,  $df=1$ ,  $p>.025$ ), said that the right for education is the most important one. Most of them considered their rights to be satisfied in family ( $M=4.63$ ) and training ( $M=4.44$ ), but the children think that their rights are not satisfied to such an extent in school ( $M=3.90$ ;  $t=1.582$ ,  $df=67$ ,  $p<.118$ ). As potential protectors of violated rights children perceive their parents, teachers, police, psychologists, coaches, doctors and friends. The coaches have high responsibility not only in sport preparation, but also in creating positive environment and climate. If the children perceive their rights respected they would feel more comfortable and will be more effective; their relationship with coaches will better. It is even more important when we know that more than 60% of children withdraw from sport after puberty and many quote as the main reason dissatisfaction with their coach and the sport environment.

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## **IS THE BMI OF SERBIAN MALE AND FEMALE ADOLESCENTS DEPENDENT ON PHYSICAL ACTIVITY?**

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The prevalence of overweight and obesity in youth is substantially increasing in many countries all over the world. Physical activity plays an important role in the prevention of overweight and obesity in children and adolescents. The primary purpose of this study is to investigate the effects of physical activity on body mass index (BMI) in Serbian male and female adolescents. The sample consists of 571 primary school students (312 boys and 259 girls). (Mean age=13,6; SD=0,66). The participants were students of 7th and 8th grade in three public elementary schools in Belgrade, Serbia. Anthropometric characteristics (height and weight) were measured and body mass index (BMI) was calculated. The questionnaire was used in the research for obtaining information about gender and age of students, as well as the time of sports or physical activities they go in for in their free time. The criteria for define subjects as physically active and physically not active one, was the time of sports or physical activity they go in for in their free time (more than 3 hours per week). A 2x2 ANOVA (male x female; physically active x physically not active) was used to determine the effects of different factors, together with their interactions on BMI. The obtained results indicate that BMI is not significantly different between male and female Serbian adolescents, as well as between physically active and physically not active individuals. On the other hand, the interaction of those two factors shows significant difference ( $F= 4.89$ ;  $p< .05$ ), suggesting that comparing to the individuals with lower BMI; female adolescents with higher BMI are more physically active than the male ones. The following post-hoc analysis (Fisher LSD test) shows significant difference of BMI between physically active and not active female adolescents. One could speculate that female adolescents with higher BMI are more considered regarding their appearance showing the motivation for its improvement. The future study could investigate the effect of history of physical activity on BMI.



**Notes:**

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## **VALIDATION OF A DISCRIMINANT MODEL FOR PREDICTING SUCCESS IN ONE-DAY ROAD CYCLING RACES**

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Main goal of this study was to examine a discriminant model for predicting success in one day road cycling races among cyclists with different competitive levels and different success in entire cycling career. Subjects consisted of 21 highly trained Slovenian male cyclists divided into two groups according to level of competition success in one day races. First group consisted of 8 cyclist category Elite Pro (EP10), age ( $23.5 \pm 4.2$  yr.), training experience ( $11.4 \pm 3.9$  yr.), BH ( $182.5 \pm 5.2$  cm) BW ( $70.5 \pm 7.3$  kg), LBM ( $66.4 \pm 6.1$  kg) and % body fat ( $5.7 \pm 1.7$ ). Second group consisted of 13 cyclist category Elite (E), age ( $20.8 \pm 3.3$  yr.), training experience ( $7.8 \pm 2.7$  yr.), BH ( $177.6 \pm 5.2$  cm) BW ( $67.5 \pm 5.9$  kg) LBM ( $63.9 \pm 5.4$  kg) and % body fat ( $5.8 \pm 1.4$ ). All cyclist performed an incremental test (initial load 150 watts (W), increase 20 W/min to volitional fatigue) on their bicycle set up on a specialized cycle ergometer (SpinTrainer – TechnoGym). Heart rate, ventilatory and gas data were collected continuously during the test with Cosmed K4b2 portable device. Lactate samples (20 $\mu$ l) were analyzed on Eppendorf Ebio +. Ten variables were pooled from incremental exercise testing data: La\_max, Max VO2\_rel, Load\_max, Load\_max\_rel, EE tot, EE anaer, EE aer, Perform Index Abs, Perform Index Rel, Perform Index Rel\_LBM for further analysis. Standard statistical methods were used for the calculation of means and standard deviations (SD). Multiple discriminant analysis was employed to investigate differences between the two study groups. In the first step an F test (Wilks' lambda) was used to test if the discriminant model as a whole was significant. In the second step the co-variance matrices, coefficients of canonical correlation and the standardized canonical discriminant function coefficients were used to classify the dependent variable. The result was considered significant when  $p < 0.05$ . Data were analyzed w SPSS version 17.0. Results of MANOVA showed that there are no statistically significant difference between two subgroups (Wilks' Lambda 0.458,  $p = 0.362$ ). At partial level we found statistically significant differences in two variables: Load max (EP10 vs E [478.7 vs 436.9 W, respectively]; Wilks' Lambda 0.672,  $p = 0.007$ ) and EEtot (EP10 vs E [73.48 vs 62.07 l O2, respectively]; Wilks' Lambda 0.772,  $p = 0.029$ ). Discriminant analyses showed that subgroups were away of at 2.132 centroid level differences (EP10 = 1.320 vs E = -0.812 centroid Z score). Also, confidential level of used sets of variables in cyclist classification according to level of competition success were at 85.7 % (75.0 % of EP10 and 92.3 % of E were correctly classified by original grouped cases). The aim of this pilot study was to examine a discriminant model pre-

dicting success in one day cycling races among cyclists with different competitive levels and different success in entire cycling career. The confidential level of used sets of variables in cyclist classification according to level of competition success is a milestone for future studies.

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## **STUDENTS CAMPS AS MODEL OF EDUCATION OF HEALTHY LIFESTYLE**

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Most of the time is dedicating to studies, exploring the literature, researches and exams. Preoccupation with the education and some exam obligations are not leaving a lot of time for students to do some sports recreational activities which can reduce stress, enlarge good mood and expand working capacity. Main goal of student's camps is to promote healthy way of living where physical activity has dominant role. Attendance of the camps will be filled with large numbers of sports recreational programs in which students will have opportunity to overview their abilities and easier decide their real activity in their lives afterwards. Beside, the program has the role to make better communication, to increase religious and national tolerance, to increase humanity towards disabled, weak and old people. Educational and creative workshops are the basic ways of implementing day and evening programs. A concept of student's camps is shown in scheme 1, and is based to focus the energy of students in direction of active participation of creating and designing all programs with help of fully trained animators and instructors. Public evidence and active participation in creating a program are movers of activities and method to direct the energy of participants. Main target is that with expand number of activities we do the repositioning and stabilization of physical activities in one systematic regular exercising and to raise physical and mental abilities. Through health care and education they will get basic information about nutrition, first aid, different diseases addiction (drug, alcohol...). Project is based on cooperation of Ministry of education, youth and sport, and health, as government representative and Sports for All associations, Student parliament as non government representative. Faculty of sport and physical education and Association of experts in recreation, Student polyclinic with help of tourist agency would take care of direct realization of the project.

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## **THERMOVISIONAL DETECTION OF VIRAL MUSCLE INFECTION IN ATHLETES**

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Infrared thermography, or thermovision, is increasingly applicable in sport. Thermic forms, thermic imprints, temperature distribution and isotherms, change of temperature degree, are all terms that will be met in sport more and more. Thermovisional method is fast, efficient, and with technology development it is becoming more and more available. In this paper thermovisional method has been used to detect viral infection of head and neck muscles (MYOSITIS). Thermovisional method in this complicated case was important for differential diagnosis. Infection looked as if it was caused by teeth, but that was wrong diagnosis. The infection has been monitored during the application of physical therapy and thermovisional method has given an objective insight into the recovering process of the athlete.

**Notes:**

[illegible]

## **MOTIVATION DETERMINANTS OF PHYSICAL ACTIVITY OF EDUCONS UNIVERSITY FEMALE STUDENTS**

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Physical activity and sport, in the process of education of youth should be a significant factor in building, maintaining and improving bio-psycho-social components of the student population. Perception of relevant issues for further operation and development of university sport in Serbia, where determinism for creating conditions to satisfy needs and interests of students for physical activity and health improvement draws special attention, identifies the necessity for establishing the basic parameters for proper organization and direction of university sport. Empirical research conducted within the University Educons from Sremska Kamenica had to define the motivational determinants of students for inclusion in potential programs of physical activity within the University. On a sample of 170 female students, the use of a modified Campbell's motivation questionnaire detected structure of motivation for physical exercise at the University, through the nine motives. Based on the results it can be, with plenty of confidence, claimed that in latent motivational structure of respondents exist four relatively stable factors that reveal the basic reasons for participating in physical exercise within the University. In accordance with motives which form them, conditions are defined as follows: (1) factor of social desirability, (2) the prestige factor, (3) the tendency toward a particular lifestyle and (4) concern for the psycho-physical health.



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**MORPHOLOGICAL AND PHYSICAL FITNESS GENDER  
DIFFERENCES BEFORE AND AFTER IMPLEMENTATION OF  
FOUR-MONTH PROGRAMMED SPORT-RECREATIONAL  
ACTIVITIES AMONG THIRD GRADE PRIMARY SCHOOL  
STUDENTS**

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World Health Organization reports in the past few years have emphasized insufficient physical activity as a sole risk factor. Categories at risk include not only adolescents, individuals exposed to excessive stress, individuals with chronic non-communicable diseases (hypertension, obesity, diabetes and osteoporosis) and elderly, but children as well. Hence our idea and our involvement into implementation of experimental longitudinal study of both genders third grade students in primary schools in Skopje, aimed at modernization of curricula for physical and health education. Given the topic of the study, the goal was to document the influence of the four-month programmed sports and recreational activities (elementary games, relay games, sport games and modern and folk dances) on the development of morphological characteristics and motor abilities in students of both genders in the 3<sup>rd</sup> grade of primary school. In the experimental program were included 39 female and 49 male students which were attending regular physical education classes and additional two special sport-recreational classes per week. In this study have been used morphological measure body height, body weight, mean chest circumference, abdominal skinfold thickness, vital capacity, and 6 tests for measuring motor performances (40 meters fast run, 4 minutes running, standing broad jump, bent arm hang, throwing small ball, throwing medicine ball over head). Analyses of variance Anova and Manova have been utilized for testing the differences among genders at the initial measurement. The testing of differences among genders at the final measurement has been performed with analyses of covariance (Ankova and Mankova). In initial testing, we have recorded significant better performances of male pupils in the variables vital capacity, 40 meters fast run, standing broad jump, throwing small ball and throwing medicine ball over head. After implementation of experimental program and neutralization of initial differences, we have detected the significant better performances of male pupils in the variables 4 minutes long run and throwing a small ball, which is result of involvement of male pupils in more intensive team sport games activities. On the other hand the female pupils show significantly higher values in body height and mean chest circumference, which is in our opinion a result of intensive growth and development during that period.

**Notes:**

[illegible]

## **EFFECT OF SPORTS MASSAGE ON MUSCLE GIRTH AND PERCEIVED MUSCLE SORENESS**

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Massage is one of the most popular and frequently-used methods of recovery in athletes. Mechanism of the effect of massage on human body is very complex and complicated and the results of many studies are disputable. The reasons for using massage are rather based on experience than on positive research results (Boone et. al., 1991). The purpose of our pilot study was to find out the effects of sports massage comparing with passive rest on triceps surae muscle girth and perceived muscle soreness (discomfort) after two types of exercise (aerobic and anaerobic). Intraclass 2x2 factor switching replication experimental design was used. Aerobic activity (12min run 10km/h) and anaerobic activity (60s Bosco test of vertical jumps) were performed by 12 ( $23,92 \pm 3,58$ ) years old students (8 men, 4 women) of Faculty of Physical Education and Sport, Charles University, Prague. After load they were immediately passed either to 5min massage of triceps surae muscle or 5min passive rest. Girth of muscle was measured by standard flexible tape (cm) and subjective perceived muscle soreness was measured by 100mm Visual Analogue Scale (VAS). The measurements was before exercise, immediately after exercise and after recovery. We compare if the massage has bigger effects than passive rest. A three factor ANOVA (time) x (type of exercise) x (type of recovery) with repeated measures showed no significant difference for influence of muscle girth and perceived muscle soreness. Muscle girth was decreased after aerobic load after massage so it seems to be more effective on muscle girth that passive rest. Difference between measurements after massage and passive rest was 0.5cm, it is boundary value for measurement error. Concerning perceived muscle soreness, all subjects had positive reaction to both types of recovery (massage, passive rest). After both types of recovery decrease magnitude of perception of soreness or discomfort in all subjects. However it is not possible to say which type of recovery is more effective on perception of muscle soreness, Partial Eta Squared ( $\eta^2$ ) doesn't have significant values. Results didn't support the notion that massage has a positive effect on muscle recovery on influence muscle girth and perceived muscle soreness. Our results are not isolated. In general the investigation in this area shows that massage has effects on psychological factors. It is possible that 5min massage is too short to be effective.

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## **PREDICTION OF SUCCESSFULNESS OF YOUNG TENNIS PLAYERS**

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The purpose of this study was to assess the possibilities for predicting playing successfulness of young Slovene tennis players. Successfulness was predicted with machine learning methods which used the most promising morphological measures and motor tests selected by automatic computer methods and by experienced tennis coaches, respectively. Studies conducted so far have pointed to a correlation between competitive and potential performance. The analysis included altogether 883 male and female tennis players, aged between 8 and 16 years old, who had undergone regular testing by the National Tennis Association and were positioned on its ranking list between the years 1993 and 2008. The analysis was performed with classification and regression machine learning methods. The selections of the most promising attributes made by the two automatic methods yielded similar results (from 60 to 70 %) whereas those of the selections performed on the basis of estimates made by the coaches differed considerably. With regard to the analysis by means of classification methods, satisfactory prediction (above 60 %) of competitive performance for both age categories was observed. Among regression methods, regression trees have proved completely useless, as opposed to the linear regression, which has yielded satisfactory results. As expected, the predictability of competitive performance by means of classification methods for individual categories was no extremely high (above 80 %). This was probably because tests were made with morphological and motor factors only, whereas practical, technical and experience factors, as well as mental abilities were not included. As a rule, when using either of the two automatic methods, nothing is to be gained by selecting only the most promising attributes in classification. This can either mean that automatic methods are not suitable for use regarding issues in question, or that the high interdependence among attributes disable more accurate predictions of competitive performance. Automatic methods proved to be more accurate than coaches for selecting the most promising attributes, which was most clearly noticeable with regard to female tennis players when linear regression was used. It, however, needs to be pointed out that estimates made by coaches are based on a highly comprehensive view of players' performance, lacking their ability to dissociate between more and less important abilities and characteristics.

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**CHANGES IN ANTHROPOMETRIC PARAMETERS AND  
OXYGEN CONSUMPTION IN WATER POLO PLAYERS OF THE  
YOUNG NATIONAL TEAM DURING A TWO-YEAR PERIOD**  
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The differences in anthropomorphic and cardio-respiratory parameters among young athletes could be influenced by the biological development itself or they could appear under the impact of the training stimulus that is characteristic for a certain type of sport. Water polo is a sport which is known for its need for high aerobic endurance. The aim of this study was to compare some of anthropometric parameters and oxygen consumption between the two measurements in a selected group of water polo players. This study includes 17 selected players of the similar age (born in 1992±6 months). The research was conducted in the laboratory for functional diagnostic in the National Institute of Sport in Belgrade. In total, 23 measurements (weight, height, ten skin folds, seven circumferences and four bone diameters) were performed within the anthropomorphic examinations. Maximal, progressive ergometric test on a treadmill (Treadmill T200 Cosmed) and on a device for direct measuring of the gas fractions in the air exhaled (Quark b<sup>2</sup> Breath by Breath Pulmonary Gas Exchange (VO<sub>2</sub>max, VO<sub>2</sub>max/kg)) was used in order to complete the examinations of the cardio-respiratory system. We performed two measurements in a selected group of water polo players. The first measurement was done in 2007. The second took place in 2009. The comparison between the measured parameters between two measurements showed the difference on the level of statistical significance  $p < 0.01$  in height (the first measuring  $183.38 \pm 5.44$  cm vs. two years later  $188.35 \pm 4.80$  cm), weight (the first measuring  $72.94 \pm 8.87$  kg vs. two years later  $81.16 \pm 6.02$  kg, chest circumference (the first measuring  $92.35 \pm 5.88$  cm vs. two years later  $100.15 \pm 3.80$  cm), VO<sub>2</sub> (the first measuring  $4192.73 \pm 649.24$  mlmin<sup>-1</sup> vs. two years later  $5148.23 \pm 393.50$  mlmin<sup>-1</sup>) and on the level of statistical significance  $p < 0.05$ , differences in VO<sub>2</sub>/kg (the first measuring  $57.54 \pm 6.34$  mlmin<sup>-1</sup>kg<sup>-1</sup> vs. two years later  $62.47 \pm 6.21$  mlmin<sup>-1</sup>kg<sup>-1</sup>), while regarding all other parameters, we didn't notice any significant difference. Comparison between two measurements showed that water polo players in second measuring have higher oxygen consumption and anthropometric parameters (height, weight, chest circumference) then those in first measuring, as a result of growing and maturing, and also due to intensive training process. Statistical changes in anthropometric parameters and oxygen consumption values within the group of water polo players were observed over two-year period.



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## **ANALYSIS OF COMPARISON BETWEEN 5 DIFFERENT CLIMBING TECHNIQUES OF 4-YEAR-OLD CHILDREN**

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Climbing, as one of the most important elementary motor patterns (EMP), is of utmost importance in the child's development and process of adopting essential motor skills. As one of the EMPs, climbing is phylogenetically conditioned, innate and characteristic of humans as a species, but we develop and preserve it differently by our way of life. Due to the nature of modern lifestyle, which is dominated by the sitting and lying positions, climbing has become one of the most neglected EMPs. With climbing, we develop whole-body strength and contribute significantly also to the development of coordination and flexibility. Owing to the nature of the movement, climbing has an important impact on the development of antigravity muscles and therefore on the acquisition of a correct body posture. Inadequately acquired elementary motor patterns negatively affect the process of upgrading motor stereotypes and consequently also result in poor and irregular physical/sports activity of children, adolescents and adults. The few studies available to date found significant differences in the climbing style between slower and faster climbers. Depending on the climbing technique, climbers are divided into better climbers, who climb correctly, and worse ones, who use incorrect climbing techniques. In this contribution we wish to present and evaluate different climbing techniques on the sample of 4-year-old children. The data collected in the framework of the national basic project J5 – 2397, on the sample of 107 children of coastal kindergartens of Koper and Škofije, was analysed using the statistical package SPSS 17.0 for Windows. Five different climbing tasks were defined, depending on the angle of the wall bar and the distance between wall bars. We found that to children different wall bar positions represent different levels of difficulty in performing the climbing tasks.

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**SPORTS AND SOCIAL INCLUSION IN VZGOJNO  
IZOBRAŽEVALNI ZAVOD VIŠNJA GORA**  
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The Vzgojno izobraževalni zavod Višnja Gora is intended for adolescents with behaviour disorders, who cannot or will not adapt to the socially acceptable behaviour standards. Due to this fact they themselves have problems and they cause trouble and disorders in their environment. Behaviour disorders are shown in different forms, e.g. lying, stealing, verbal and physical aggressiveness, inappropriate sexual behaviour, disobedience, etc. The environment reacts inappropriately to their behaviour and therefore the adolescent develops defensive behaviour, with which come disorders in the developing personality. Due to the fact that this process also includes an emotional sight of the adolescent's self-image, these disorders are also called emotional disorders. Adolescents, who are included in the establishment by Social Work Centres or by the court, are familiar with the feeling of being given the cold shoulder or the social exclusion, which is the term for what may happen when people suffer due to a combination of related phenomena, such as unemployment, poor social skills, domestic problems, unfinished schooling, etc. In our establishment we are aware that the inclusion of these adolescents requires fully developed educational programme because individual treatment makes the development of abilities of each individual possible, it enables the adolescents to choose and it encourages them to further development and learning. Besides all this it gives them the opportunity of active learning. The priority of the inclusion is admitting the adolescent's being different from the majority. Being different is, in the context of the inclusion, a quality and the climate set with its implementation is a climate where being different is respected and accepted. Throughout the years we have been noticing that inclusion in sport projects has psychological (higher self-confidence and self-image, satisfaction, higher motivation, directing the aggression and the capacity for a healthy assertion, better concentration, etc.) and social effects (making friends, determination and patience, self-discipline and the feeling of appurtenance). The article presents the inclusion of the establishment and adolescents of the Vzgojno izobraževalni zavod Višnja Gora into the international project, where the main point was sport.

**Notes:**

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**SPORT ACTIVITY FOR CHILDREN WITH SPECIAL NEEDS – A  
JURČIČ'S PATH MARCH  
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Children with special needs (emotional and behaviour disorders) are placed in juvenile establishments. Adolescents in their original environment did not successfully develop their primary abilities to such an extent that they could be successful in their environment. Therefore, they are placed into an establishment that enables them to show, among equal companions, that they can also be successful. They can prove this to themselves and to others through several activities for which many have the abilities but one needs to find them. The intention of the Vzgojno izobraževalni zavod Višnja Gora is to educate adolescents aged from 14 to 19 years. They are placed into five educational groups and into one residential group, located in Ljubljana. They are placed by the Social Work Centre or the court. The adolescents are included into the internal school where they are educated for the following professions: gastronomic hotel industry worker, assistant in biotechnics and supply, administrator or clothes manufacturer. Vzgojno izobraževalni zavod Višnja Gora each year traditionally organises a Jurčič's path (Jurčičeva pot) march for children and adolescents from all Slovenian establishments. The work with young people with special needs requires the pedagogues to be inventive and original. When organising such a march we must take into consideration the specifics of adolescents and therefore we use as many motivating factors as possible during the march. We set different activities that adolescents must solve during the way. These activities are fun, humorous, they include sports and they are educating. In the beginning they visit Jurčič's home, they perform parts of literary works in their own, humorous way, they chop the devil out of the boat, they play fun games, recognize medicinal herbs, etc. In the end they get awards and gifts and they can also enter a singing competition – karaoke. During the march itself the adolescents prove themselves capable; they realize they can do it.

**Notes:**

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**BLOCK VOLLEYBALL TACTICS, MOTOR CONTROL AND  
BODILY COMMUNICATION**  
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Volleyball is a game sport in which the ball is continuously rejected so fast than other game sports and the ball speed is high and the perception is extremely important. It could be helpful to make a research on the relation between making decisions of tactical choices and other aspects such as motor control and bodily communication. Tactical block choices are: Read block, when the blocker jumps to block the spike in the middle of the net, then the decode of the trajectory as destination, time and direction of ball setting; Option block, when the blocker jumps as before, without to decode the trajectory of ball setting; Anticipated block, when the blocker jumps as before, making decisions before the setter touches the ball. Motor control is a closed loop, that occurs with constant adjustments of motor skills by feedback over 200 milliseconds and recruitment of other data from memory; open loop that occurs without adjustments because the feedbacks up 200 milliseconds are not utilizable by mind which uses an innate scheme; motor imagery, that occurs before the stimulus activates the response. Bodily communication is made by context, start, destination, channel and code, and the aim is to analyze the relations among them. Methods are the argumentative approach to study volleyball, motor control, bodily communication. Then, the applicative research with descriptive approach on 10 block volley actions by video performance analysis to recruit data about making decision of tactical choice, kind of motor control and one aspect of bodily communication. Data are recruited and gathered by team made by athletes, the analyst and the coach that are been trained on the evaluation. Read choice is executed with closed loop 9 times and with open loop 1 time and it's in relation with the code aspect. Option choice is executed with open loop 9 times and with closed loop 1 time and it's in relation with the destination aspect. Anticipated choice is executed with motor imagery 10 times and it's in relation with context aspect.



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## **EVALUATION MODEL ON BODILY COMMUNICATION IN VOLLEYBALL**

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The attribution of outcome points in volleyball is always uncertain for the subjective evaluation of the analyst. In this sport, the use of body language is very frequent because the actions are extremely rapid, whose technical characteristics, tactics and logistics constantly helps the use of it. Decoding of signs or of facial expressions is “functional” when it refers to the same team among players or that one between the coach and the athlete on tactical intentions. Decoding can also be “diagnostic” when it is possible to recognize the useful data of the opposing team. It is again “tactics” when the gesture or the action simulates a game intention to solicit a reaction of the adversary who helps their own team. So the decode of communication of body could have a different process. The aim is to count the outcome points in 3 fast volleyball skills: the second ball goes to the opposite court instead of setting it for attacking, the attack as fast as possible in the middle of the net and the off speed hit instead of power spike over the block in a new method way and compare to a data of the analysis. An integrated model by descriptive research and action research is used and this is realized by a team made of athletes, who analyse their own actions: team’s analyst, who analyses every action and the coach that helps the analyst. All together watch the frame of game by video performance analysis and recruit data on athletes’ performance in bodily communication. Then it compares the two collections of data. Analyst data is 14.5% b) for the attack as fast as possible in the middle of the net, 6.5% a) the second ball goes to the opposite court instead of setting it for attacking and 8.5% c) the off speed hit instead of power spike over the block. The percentage for categories of outcomes is 30% bodily communication, 18% fundamental outcomes, 17% adversary errors and 16% other kind of outcomes and 9% unknown outcomes. Team data is 16 % for b) the attack as fast as possible in the middle of the net, 8.5% a) the second ball goes to the opposite court instead of setting it for attacking and 8.5% c) the off speed hit instead of power spike over the block. The percentage for categories of outcomes is 33% bodily communication, 18% fundamental outcomes, 17% adversary errors and 13% other kind of outcomes and 9% unknown outcomes. The difference between the two methods is attributed to a better analysis of the analysis team.

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## **WHAT DO YOUNG PEOPLE THINK ABOUT EXTREME SPORTS?**

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The modern way of living and contemporary trends confirm that more and more people actively participate in extreme, adventurous activities, which can be particularly noticed among younger people. Everyday life of the people does not include a lot of excitement and danger. Therefore, the dissatisfaction with the ordinary life and the social requirements are supposed to have enforced the need for stimulation. All this can be satisfied with participating in »extreme« activities. Extreme athletes are from the perspective of the media introduced to the public primarily as people who take unreasonable risks in their exploits and ventures and in this way put at risk their own existence, so they have characterized these activities as illogical and being the indicators of insanity. The purpose of the research was to determine the perspectives of young people in Slovenia regarding the participation of a continuously greater number of athletes in extreme sports. At the forefront there is the recognition of the reasons why people actively participate in extreme sports. We were also interested in the popularity of different kinds of extreme sports as well and in the attitude regarding the dangers and strains of these types of extreme sports. The research was based on sample of 796 persons in a range from 11 to 27 years of age. To find different attitude in the kinds of extreme sports we divided the respondents into two groups. First group consisted of those people who are younger than 19 years of age and second group consisted of those people who are between 19 and 27 years of age. Some of the stereotypes about these athletes, are that don't care about their own lives, and they purposely endanger their own health. In consequence the expected results should indicate unpopularity of this kind of risky activities, but results showed the opposite. The results in popularity showed statistically significant differences between both age groups in some kinds of extreme sports like skateboarding and snowboarding. Among the most dangerous sports those young people place: mountaineering and downhill mountain biking, and while the most strenuous sports are ironman and ultra-cycling. Based on the results of the research, people consider that the reasons for the participation in extreme sports to be pleasure, entertainment and attractiveness of the sports activities.

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## **“I GIOVANI PER I GIOVANI” (“YOUTH FOR YOUTH”) AN ITALIAN GOOD PRACTICE IN SOCIAL INCLUSION OF DISABLED THROUGH SPORT**

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“I Giovani per I Giovani” is a big sport party: every year in the main arena of Milan around 6.000 pupils assist to a program of sport activities performed by disabled (sensory, mental and physical) athletes, usually pupils of high schools as well. Before the event, several workshops take place in schools, focusing on “ability/disability”, “sport for all” and social inclusion through sport. The students are asked to prepare banner, songs, flags and compositions for the event: the most creative students get prizes during the event. “I Giovani per I Giovani” gathers together pupils through sport independently from the body ability. It offers the possibility to reflect about several issues like “ability of disabled”, “normality/diversity”, “sport for all” and social inclusion through direct experience. As consequence, the pupils change their vision of disabled and disability. Moreover, for the disabled athletes, the event is great possibility to perform in front of “big public” and to feel the warm cheering of their school mates. The event has a long tradition in Milan – in 2011 it will be the 31st edition – and it is organized by “I Giovani per I Giovani onlus” and Lions Club, in cooperation with “ASTIPA” – an Italian NGO. The event is supported by the Region of Lombardia, the Province and the City Council of Milan. Our next challenge is to transform “I Giovani per I Giovani” in “Youth for Youth”: we want to make our event international, hosting delegations of foreigners disabled and sending Italian disabled to international sport meetings. We want to proof that sport is a universal language able to gather together pupils independently from body ability and nationality. We are keen to promote social inclusion and European awareness through sport, through facilitating international exchange of good practices in social inclusion domain and through organizing international sport meetings with disabled participants. In other words, we want to “export” the model of “I Giovani per I Giovani” abroad and to “import” in our local context good practices successfully experimented abroad. We consider networking and cross-sector cooperation as key-factors to develop future projects. We are ready and open to co-work with organizations active in social inclusion of disabled through sport across Europe.

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**THE PERCEPTION OF SPORT AMONG PUPILS OF CLUJ  
NAPOCA, PILOT PROJECT  
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What does the youth think about sport? How the pupils perceive a complex phenomenon as sport? In our global society, sport can be considered a multi-faceted phenomenon. In order to spread into society the benefits of sport and to make it fully inclusive, the perception of sport among youth – thinking in long-term perspective - is relevant, especially in policy-making phase. The goal of my research is to understand if sport is perceived as tool useful to promote education, socialization, healthy-lifestyle, active citizenship and leisure or if it is just a competitive phenomenon. The research is based on quantitative methods: the form, based on Likert scale, measures six concepts of sport: competition, education, fun, health, socialization and participation. Each concept has eight items, divided in nine batteries, related to game, regular season, training, “champion” (X2), value of sport (X2), physical education and to be spectator of sport events. The form includes also a part related to sport idols. The respondents are divided in two groups, in relation to the engagement in sport. 422 pupils of last year of nine high schools of Cluj Napoca filled the form: they were selected through cluster sampling procedure. The results show that health is the main aspect of sport. Education, competition and socialization are important as well. Participation and fun are less considered. Males are more attracted by fun than females. “To play well for the team and to help team-mates” is the most important element of the game. The main aspect of training is the skills improvement. Thinking at the regular season, to participate in the championship is very important. “To win a lot of competitions and games” is the main characteristic of “the champion”. The pupils engaged in sport would finally suggest to start to practise sport “to have a healthy lifestyle”. Pupils not-regularly engaged in sport. Physical education in school “is useful to develop body and mind”: moreover it “teaches values as respect, tolerance and discipline” and “it makes school more attractive”. While spectators of sport events, the pupils are focused on technical and tactical plans. “The champion” wins a lot of competition and games. The pupils not engaged in sport would start to practice sport to have an active lifestyle. The main sport idols are “national sport heroes”, “global sport icons” or “number one” in their discipline. The consideration of health, education and socialization are very interesting elements: the pupils, both engaged and not-engaged in sport, consider health as main benefit of sport. GO, NGO and private sector should be aware of these elements.



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**INEQUALITY IN SPORT AND PHYSICAL ACTIVITY AMONG  
NORWEGIAN YOUTH: 1992–2010**  
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In this paper we present results from of a study of participation in sport and physical activity among Norwegian youth covering a period of almost 20 years. Two topics are addressed. First, we look at how the participation itself has changed during this period, and four types of participation are included: sport clubs, fitness centres, unorganized activity and fighting sports. Second, we look at how participation at each point in time is explained and how the importance of various explanatory factors also changes over time. Gender, class and ethnicity are the explanatory factors in focus, but other explanatory factors will also be controlled for. The data is three general population studies of 13-18-year old Norwegians, "Young in Norway 1992" (N=10,460, response rate= 97.0%), "Young in Norway 2002 (N=11,371, response rate= 92.3) and "Young in Norway 2010"(N= 8,356, response rate 72.4). These three studies used similar sampling procedures, data collection procedures and measures of sport participation and background variables.

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## **YOUNG ATHLETES AND LATERAL CHOICES IN DIFFERENT SPORTS**

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Humans prefer to use a limb rather than the other, and not always the same for different tasks. Furthermore, people show a variable functional asymmetry: somebody is markedly right- or left-sided when performing different tasks, while others show various degrees of mixed laterality. Aim of this study is to investigate the lateral choices among young athletes practicing different sports. 390 young athletes (M: 234; F156) practicing sport in Emilia-Romagna and Abruzzo, Italy, aged 11-14 were divided in eight sport groups: Soccer, Athletics, Volleyball, Basketball, Other Team Sports (OTS: Rugby, Handball, Water Polo), Individual Sports (IS: Triathlon, Gymnastics, Swimming, Roller Skating, Rowing), Combat Sports (CS: Judo, Karate, Wrestling), Sport requiring a lateral choice (SLC: Fencing, Tennis). Different tasks were used (performance test) to assess lateral choices: 11 tasks for the hand, 4 for the foot, 5 for twist rotation. Lateral choices were assessed following two criteria: first, noting the side used by the subjects in writing, throwing or kicking a ball; second, computing an index, taking into account the number of right and left performances for all the tasks. In this case subjects choosing the right or left side in all the tasks (or all except one) were considered right or left sided; the other subjects were considered and named "inconsistent". Writing, throwing and kicking sidedness data were then reported for each sport or sport groups such as frequency and percentage of subjects right, left or inconsistent in hand, foot and twist choices among these sport categories. Lefthanders in writing and throwing are highly represented in SLC (15% of the sample and 11% respectively) and volleyball (11%); in kicking, OTS is the highest represented category with left choices (29%), followed by basketball and soccer (23%). Hand, foot and twist sidedness are then described for each considered sport or sport group. Lefthanders are highly represented in volleyball and SLC (8%), inconsistent in OTS (22%). Left footed are mostly represented in SLC (30%), CS and soccer (21%); inconsistent in soccer (26%), IS and volleyball (23%). Left twist-ers are numerous in SLC (33%) and athletics (18%); inconsistent in OTS (76%) and IS (75%). Left-handed and left-footed are highly represented in SLC, CS and soccer. This could be due to selection factors and training tactical and strategic choices. Inconsistent are prevalent in OTS for the hand, in soccer for the foot and in all the sports involving twist direction.

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**DAILY ENERGY EXPENDITURE AND PHYSICAL ACTIVITY  
LEVELS OF 11-YEAR-OLD GIRLS IN SLOVENIA AND CROATIA**  
***Sorić M.<sup>1</sup>, Strel J.<sup>2</sup>, Kovač M.<sup>2</sup>, Jurak G.<sup>2</sup>, Starc G.<sup>2</sup> and Mišigoj-  
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**AIMS:** The growing epidemic of obesity is becoming more and more pronounced, even among children. Physical inactivity, along with inadequate nutrition, is one of the main reasons of the growing prevalence of obesity. Therefore, as a part of a bigger survey, the aim of this study was to objectively evaluate physical activity levels and energy expenditure in 11-year old girls in Slovenia and Croatia. The sample consisted of 99 girls (50 from Slovenia and 49 from Croatia), mean age (SD) = 11.4 (0.4) years. Energy expenditure and physical activity were assessed during two weekdays and two weekend days using a multiple-sensor body monitor (SenseWear Armband; BodyMedia Inc., Pittsburgh, PA, USA). Differences between groups were tested using a t-test for independent samples and Mann-Whitney U-test for non-parametric data. No significant differences between the two countries concerning total and active energy expenditure or time spent in moderate and very vigorous physical activity were found. However, girls in Slovenia engaged in more vigorous physical activity compared with their Croatian peers, median (interquartile range) = 11 (5-20) minutes and 6 (2-12) for Slovenia and Croatia, respectively,  $p=0.004$ . In contrast, the average time spent lying down was higher in Slovenian girls compared with their peers in Croatia [547 [38] vs. 529 [45] minutes,  $p=0.04$ ]. The difference in physical activity levels were more pronounced during the week than on weekends. It should be noted that the differences between the most and the least active girls were large. In addition, very vigorous physical activity was not observed at all in 27% of the children. Total energy expended in daily physical activities was similar in Slovenian and Croatian girls, although girls in Slovenia engaged in more vigorous physical activity.

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**COMPARISON OF ENERGY EXPENDITURE DURING  
SCHOOLDAYS AND WEEKENDS BETWEEN 11-YEAR-OLD  
BOYS FROM LJUBLJANA AND ZAGREB**

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The purpose of the study was to establish the energy expenditure among 11-year-old boys from Ljubljana and Zagreb. We used SenseWear Bodymedia energy expenditure monitors to establish the quantity and structure of used energy in regard to intensity of physical activity during schooldays and weekends. The data was recorded 24 hours a day from Wednesday to Monday and the data from Thursday, Friday, Saturday and Sunday was used in the analysis. The selected sample of 11-year-old boys included 49 from Ljubljana and 37 from Zagreb. The measurements were organised in April and May 2007. We calculated total daily energy expenditure, including active and basal energy expenditure, and within active energy expenditure also the time of low (< 3 MET), moderate (3-6 MET), vigorous (6-9 MET) and very vigorous (> 9 MET) energy expenditure, as well as time of sleeping and laying down during schooldays and weekends. The results showed that energy expenditure among 11-year-old boys is higher during schooldays than weekends but that the differences between intensity and duration of activities are considerable – regarding total energy expenditure the active boys reach three times higher levels of energy expenditure than inactive boys in general, and they spend ten times more time in very vigorous activities than inactive boys. The differences are observable also in basal energy expenditure. We established that boys from Ljubljana reach higher levels of basal energy expenditure than boys from Zagreb and the differences are obvious especially during weekends. The time of very vigorous energy expenditure among boys from Ljubljana is three times longer than among boys from Zagreb. Important differences occur also in time of sleep where boys from Ljubljana sleep longer during schooldays and the boys from Zagreb during weekends.



**Notes:**

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## **COMPARISON OF SLOVENIAN CHILDREN AND YOUTH PHYSICAL FITNESS IN THE PERIODS OF 1991–2000 AND 2001–2010**

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The SLOfit monitoring system started to be implemented 4 decades ago and enables the comparisons of physical fitness of children and youth with previous decades. We analysed the differences in physical fitness of primary and secondary school pupils in the last two decades. In that period we gathered 4,006,326 measurements including 3 morphological and 8 motor measurements. The measurements, included in the SLOfit monitoring system fitness evaluation, were taken by physical education teachers according to the prescribed protocol. The results show that children and youth achieved higher values in body height, body weight and upper arm skinfold in the period 2001–2010 than in the period 1991–2000. The most distinctive changes occurred at the age of 8 and were then gradually increasing until age 14 when they moderately decreased. On average body height of boys and girls in the first decade of the second millennium increased by 0.4% in comparison to the last decade of the previous millennium, body weight increased by 2.8% and upper arm skinfold for more than 9%. The changes were more significant among boys. All motor abilities, except muscular endurance of the torso, have deteriorated, especially among boys. The greatest negative trends were established at the beginning and at the end of schooling, while the most diverse changes were observed among boys and girls at 7 years of age.

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## **IMPLEMENTATION OF NEW TESTING AND TRAINING TECHNOLOGIES IN THE PROCESS OF DEVELOPMENT OF YOUNG KARATEKA: A PILOT STUDY REPORT**

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The aim of this pilot study was to facilitate translation of scientific knowledge into the training and testing system of competition oriented training (COT) of modern karateka. The presentation depicts a report about the experiment that was introduced with the goal to develop a new useful testing tool for situational reaction time and punch dynamics measurements. COT group of Karate Club Kranj (30 karateka; 16 female, 14 male; body height  $167.5 \pm 9.6$  cm; body weight  $59.8 \pm 13.1$  kg) was used for the implementation of the novel training approaches and their optimization. The age of the subjects ranged from 10 to 24 years (mean 17.2, s.d. 4.2 years). Their competition history ranged from 2 to 8 years (mean 6.1, s.d. 3.4 years). A subgroup of 18 subjects volunteered for the experimental study on reaction time and punch evaluation. The training and selection system which we set for COT groups can be summarized as: (i) recognition of the highly motivated individuals who show interest for karate competition, (ii) progression from basic traditional karate training to karate COT in about three years period, (iii) subdivision of the COT group into basic and advanced level, and the corresponding, (iv) progression in complexity and quantity of the technical-tactical as well as physical conditioning training in these groups. The basic-level COT group is limited to 12-20 members aged 10-15 years, who can become members of the advanced group which is limited to 10-15 members, normally when 14 or 15 years old. We have developed a system of exercises and methodological approaches which help in optimizing physical abilities of karateka – based on the concepts of progression in intensity and volume of training. Members of the COT groups also undergo regular testing of physical abilities, with special attention to speed, agility, and quickness tests. We have developed a field test aimed to precisely evaluate situational reaction time and dynamics of the karate punches. It is a computerized electronic system which proved to have a high practical and scientific potential. Results of our study revealed high repeatability ( $ICC(1,3) = 0.91 - 0.97$  for different parameters), good enough sensitivity, and high objectivity. Technical details of the product and its development will be presented. Regarding its complex movement structure as well as the need for peak physical conditioning, modern karate can be a good media to implement further studies on the field of motor control and motor behaviour. A combination of a strong traditional training approach and very limited fi-

financial resources in this sport has resulted in many opportunities to further upgrade technology of training and testing and thereby help gain even better results.

**Notes:**

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## **STATIC AND DYNAMIC BALANCE IN YOUNG CLASSICAL FEMALE BALLET DANCERS**

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The goal of this study was to test static and dynamic balance in young well trained classical female ballet dancers with the aim to gather preliminary reference data about balance in female ballet dancers. Furthermore, we compared their results to the norms we have for the other groups of subjects. Twenty-seven female collegiate female ballet dancers volunteered for the study. Each subject performed six different balance tasks – still stance in: (i) parallel stance, (ii) single leg stance, (iii) closed eyes single leg stance, (iv) 2nd position on toes; and (v) active balancing on a tilt-board in parallel stance – frontal plane, and (vi) single-leg stance – sagittal plane. Static balance tests were analyzed using a force plate, while dynamic balance was quantified using an electronic tilt board. All the repetitions (three repetitions of each task) were carried out in a random order, which in combination with rest intervals, minimized the potential learning and fatigue effects. Results showed an almost linear trend in the increase of all the body sway related parameters from parallel stance, over single leg stance to the closed eyes single leg stance; values for each being about a twofold. Majority of the parameters showed above-average values of the dancers' stability. Second position on toes showed comparable values to those from single leg stance with open eyes. The relative effects of increasing the task intensity were much less than known for normal subjects. In this context, also the dependence on visual feedback turned out to be less expressed. We hypothesize about the sport-, task-, and environment-specific balance adaptations. This, however, could be important information for practical implementation of balance exercise into balance training routine as well as a guide for the future research on the field.

**Notes:**

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## **MOTOR AND MORPHOLOGICAL DIFFERENCES BETWEEN YOUNG HANDBALL PLAYERS FROM THREE AGE GROUPS**

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In competitive sport, regular measurements are made to monitor how athletes are developing in different areas. The main focus is on the morphological physical and motor areas since they are both highly correlated with playing performance (Mohamed, et al., 2009). In Slovenia, a special measurement system was designed for three age categories of young handball players of the national team, namely with a respective average age of 17, 19 and 21. The applied measurement procedures covered the majority of abilities and characteristics relevant to handball players' efficiency. The study aimed to establish whether any statistically significant differences exist between these age categories in terms of the results achieved. For this purpose, members of the Slovenian national team born in 1990 and 1991 were selected so that their average respective age was 17, 19 and 21 years. The set of motor measures included 10 parameters covering various motor areas relevant to handball. The measures defining the subjects' morphological status included 8 parameters or appropriately calculated indices. The number of subjects differed each year, although all three measurements were carried out with the 12 subjects included in our study. All measurements were conducted by the same people, using the same measurement technology. The results were processed with descriptive statistics methods and the differences between the groups were established using an analysis of variance. The results showed that statistically significant differences between young handball players aged 17, 19 and 21 could not be confirmed in any of the studied parameters. Obviously, 17 is the age at which those players who were included by their coaches among the ranks of talented national team players have reached their biological maturity in morphological and motor terms. The majority of morphological characteristics and motor abilities are highly genetically conditioned. Thus, no statistically significant differences were established between players older than 17 years in terms of the discussed parameters. Evidently, the training factors do not provide a sufficiently strong stimulus for the development of motor abilities. A finding with the greatest relevance for practice is that, on average, young handball players reach their biological maturity at the age of 17, after which their biological development alone no longer alters their motor abilities and morphological characteristics. The second finding concerns the training stimuli which should be stronger at this age and should accelerate players' development, mainly in terms of their motor abilities.



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## **ACHILLES TENDON DEVELOPMENTAL FACTORS IN CHILDREN**

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Achilles tendon (AT) is an important connective tissue organ that connects calf muscle mass and calcaneus. There has been little research in AT developmental potential in children although it seems to be the basis for a child's motor development, especially of flexibility, strength and speed. There might be a relation between the variance of geometry of AT and the morphologic characteristics of the muscles of the calf, their geometry and the strength parameters of ankle and knee. Our work was aimed to explain AT geometrical characteristics in 4-year old children with several factors, such are: body morphology, calf muscles geometry and architecture, and ankle/knee maximal voluntary torque. Measurements were conducted on 104 children using standard instruments, diagnostic sonography, adapted isometric dynamometers for knee and ankle. Using multiple linear regression we have found a significant relation between AT diameter as a dependent variable with the chosen factors ( $R = 0.519$ ;  $P = 0.015$ ). Significant partial correlations were found for: muscle gastrocnemius medialis diameter ( $R = 0.324$ ;  $P = 0.004$ ); pennation angle in muscle gastrocnemius medialis ( $R = -0.263$ ;  $P = 0.020$ ); and muscle soleus diameter ( $R = -0.314$ ;  $P = 0.005$ ). Interestingly, we have not found significant correlation between maximal knee and ankle torques with AT diameter. In conclusion we could confirm that AT diameter is related to calf muscle geometry and architecture but only with 27% of explained variance. Interestingly, the muscle gastrocnemius medialis diameter is positively related, while muscle soleus diameter negatively related to AT diameter. Findings of others have shown that AT diameter is significantly lower in children with hypercholesterolemia in their family. Furthermore, recently Morse et al. showed that 8- to 12-year old children produce 20% more relative muscle power than adults. The explanation could be related to Golgy organ situated also within tendons. The development of Golgy organ impacts the inhibitory function of muscle force production that might be more expressed in adults than in children.

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## **SUCCESS FACTORS IN FENCING – REVIEW OF WORLD ELITE TRAINERS**

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Although the fencing sport is limited with unilateral movements back and forth along the fencing piste it contains all the range of motor abilities and skills that are essential for successful performance and for the results. Achieving the score requires an extraordinary speed, explosiveness and precision coupled with stretching of the back (reflex) leg while performing step, jump and lunge. The main objective of this study was to define the factors of success of certain anthropological dimension of success in fencing, and any differences between weapons among épée and foil. Sample of the examiners included 16 coaches during the junior and cadet World Championship in Belfast 2009. In the purpose of this study questionnaire was made of relevant anthropological dimensions subjoined with technical and tactical variables followed by motor skills, and ultimately the three types of dimensions of power. Data were processed by computer program statistic 7 (Stat Soft USA). Descriptive statistics (mean and standard deviation) was calculated. To determine differences in answers between the disciplines, parametric Z test was used. According to the opinion of the surveyed trainers we came to a partial difference in the hierarchy between offered anthropological dimensions. Psychological profile of fencer was found as the most important in the first place for epee, followed by motor skills, then TE-TA preparedness, intelligence and ultimately physical constitution. In foil result were slightly different, motor skills are in first place and conative characteristics on the second, followed as in epee TE-TE preparedness, intelligence and physical constitution. Although the partial sequence shown in two different disciplines, the results of Z tests indicate no statistically significant difference between the offered anthropological dimensions. Regarding motor abilities, common to both disciplines is that the speed and coordination had the highest and balance lowest of importance for the prediction of success in fencing. Z test results show a statistically significant difference between disciplines (épée and foil) and to the flexibility and precision. Regarding the order in hierarchy of types of forces trainers were almost unanimous. Also the results were almost identical for both disciplines. Maximum strength was placed in last place in importance. In second place was muscular endurance and maximum explosive power was characterized as most important. Z test results showed no statistically significant differences found between disciplines in all three dimensions of power. The data obtained have satisfied the aim of the study and gave an answer which factors are responsible for the performance of Fencing, or the success of a results. Considering that in this paper, coaches were examined, in the future it would be interesting to test the top fencers in all dimensions, and compare the results obtained

with this study as well as to create certain specific tests and conduct research at the highest competitive level fencers in order to determine the actual difference. Finally, this approach or the way of research through a survey has its value with respect to the respondents as the top world and European coaches, and their criteria for success can open a variety of dilemmas and inspiration for further research.

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## **MONITORING MOTOR ABILITIES OF YOUNG WATER POLO PLAYERS**

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In order to evaluate motor abilities of a young water polo player specific skill tests in the water should be performed. The battery of eight tests was developed and used to monitor 246 young water polo players from eleven to sixteen years of age: swimming at distances 5, 25 and 200 meters, swimming 4x5 meters with changing directions, ball dribbling, vertical jump and reach, vertical egg-beater kick and velocity of a throw at the goal. Descriptive statistics, analysis of variance (ANOVA) and discriminant analysis were used to analyse data. Monitoring the results of particular test through years, the progression of the achieved results was found as expected, probably as the summing effect of the biological and technical development of the growing up players. When analysing the differences between the three age groups (11-12, 13-14, 15-16 years of age) it was found that the youngest and the middle age groups differentiated most in tests evaluating skills without ball (swimming 25 m, vertical jump out of water, swimming 4 x 5 meters), while the middle and the oldest age groups were best differentiated by the tests requiring ball handling skills (throwing velocity, ball dribbling). It was also shown that some tests (25 and 200 meters, followed by vertical-egg beater kick and throwing velocity) could differentiate between the groups of players which were tested at the age of 13 to 14 and were two years later selected or not selected to the youth national team U16.

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## **A MODEL OF ANALYSIS OF PREPARATION FOR 28 KM LONG RUN – A CASE STUDY *Štrumbelj B.***

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Training is used for improvement of specific functional abilities in sport to improve performance. However there is often individual response to specific training and coaches should have a system of evaluation of training effects for each sport discipline and monitoring of training. The aim of the study was to establish a model of analysis of training and its effects to specific functional needs of long distance run. In the research one moderately active subject (age 25 yrs, weight 79 kg) performed long distance endurance training to increase endurance. During the 123 days long experiment heart rate and body weight at rest were monitored. The amount and intensity of exercise during preparation period was monitored with the use of Polar heart rate monitor based on average heart rate during exercise. Four tests of repeated runs on 1,200m distance with increasing speed were performed at which blood lactate concentration and pH from blood capillary sample were measured. Three test of run on 4,000m on which average running speed and heart rate were measured have also been performed. Tests were performed at the beginning of the experiment, after completing first and second meso-cyclis and another after two month of period of no exercise. Exercise resulted in positive changes in all monitored variables. Lactate and pH curve according to the running speed during the test typically moved to the right. Heart rates at rest and during submaximal exertion have fallen. Body weight gradually slightly decreased. In the period after the termination of exercise, all the observed variables returned to approximately the same level as at the beginning of the experiment. The exception is the value of body weight, which remained at slightly lower level. The average speed at the competition on 28 km was close to the lactate threshold during last test of repeated runs on 1200m distance before competition. Proposed model of analysis of preparation seems to be sensitive for evaluation of training effects and preparation to long endurance run.



**Notes:**

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## **THE SYSTEM OF PSYCHOLOGICAL SUPPORT IN CHILDREN'S AND YOUTH SPORT**

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The development of children's and youth sport is not only the most important factor for forming of good health of young generation but it also makes a foundation for developing the sport of highest achievements. Preparing a sportsman means the developing of his physical, psychological qualities, technical and tactical skills. At the same time as the praxis of children's and youth sport indicates, the efforts of coaches are directed only at the achievement of sport results. Existing system covers generally the improvement of both physical qualities and technical, tactical skills to the prejudice of psychological and personal qualities of a young sportsman that does not favour his character formation when we consider him as a personality. Under the influence of this guideline the young sportsman's education is coming out of his coach's view that has a negative influence on achievement of sports results. Such a situation is caused by the absence of psychological support in children's and youth sport. There are no recommendations for working with young sportsmen in syllabuses of children's and youth sports schools as well. Thereby children's trainers cannot organize the training process in a proper way that has been proved by a considerable elimination of young sportsmen in the first training phase. Taking in consideration the situation described before it is necessary to create a psycho-educational system to support the young sportsman activities. The work on the psychological support should be an important part of this system. This system appears to include the improvement of personal qualities, forming of sports motivation, psychological stability, self-control ability that will facilitate sports achievements. The most important personal qualities for achieving mentioned objectives are self-determination, purposefulness and responsibility. No less significant fact is development of such psychophysiological characteristics as attention focusing, psychical self-control, psychological stability, the improvement of them will advantage the sport results. To achieve mentioned objectives we want to introduce a technology for psychological support of young sportsmen. This technology includes several stages. As the researches on using this technology for young sportsmen showed, self-control rates increased from 34 to 52 %, responsibility rates from 20 to 48%, aspiration level from 2,57 to 2,79, attention focusing from 9 to 5,2. The acquired results allow us to consider that this technology gives an opportunity for a trainer working with young sportsmen to carry out effective psychological support.

**Notes:**

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## **RELATIONS BETWEEN SOME MOTORIC ABILITIES WITH THE RESULTS ACHIEVED IN SHOT PUT**

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In the age of modern technology in the biomechanical analysis and prediction of achieving top results in sports, in the training process of young children, it is desirable to apply the standardized motor tests and anthropometric methods. Shot put is an athletic event that requires mastery of technical performance and the timely performance of kinetic chain movements. The weight of the ball is an additional element that can influence on the technical performance throws. It is therefore desirable to try to determine the motor tests, whose application can predict success in the shot put, it is the existence of opportunities for achieving greater distances, and therefore have elements of early selection. The purpose of this study was to find which of the tests for motor coordination, flexibility and explosive strength mainly refers to the ability to achieve high results in the shot put. Tests flex with a stick, deep forward bend on the bench, throwing medicine ball from lying position, the standing long jump, squat content with the load, dribbling by hand, slalom two balls with legs and shot put weight 5kg, was applied on 115 first grade students secondary schools in Banja Luka, age 16 years  $\pm$  6 months. The study was conducted in the morning, at the City Stadium of Banja Luka and the Faculty of Physical Education and Sport in Banja Luka. To process the data, we used the statistics package SPSS 11.0 for Windows. The ratio between motor coordination, flexibility and explosive strength was determined by the application of regression analysis. The result obtained by statistical analysis showed that the applied tests have statistical significance of  $p = .000$ , and that 76% predict results to be achieved in the shot put, and that the test throwing medicine ball from lying position has the greatest statistical significance (.000). Statistical significance are shown in the tests the deep forward bend on the bench (.099) and standing long jump (.103), while tests dribbling by hand (.501), squat content with the load (.514) and flex with the stick (.556) have less statistical significance, and test slalom two balls with legs has an almost negligible effect on the results achieved in the shot put (.794). Research has shown that the explosive strength and a leg flexibility associated with the highest achievements in the shot put, that the static leg strength, coordination of hands and hand flexibility can partially affect, but the coordination of a leg is no importance for achieving results in the shot put. It is essential that the tests are throwing medicine ball from lying position, a deep forward bend on the bench and the standing long jump may be used as valid indicators in the prediction of results and for the selection of younger ages.

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## WHAT ARE THE MOTIVES OF PARENTS FOR ENGAGING PRESCHOOL CHILDREN INTO SPORT PROGRAMS?

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The aim of the research was to establish the motives of parents for engaging their children into sport activity. In preschool period child should gain as many different movement experiences as possible. It is the period when positive attitude towards sport activity is founded. Sport activity isn't satisfying only child's need for movement (which is the first activity for 'learning the world'), but has a very important role in wholesome development of a child (morphological, motor, intellectual, emotional, social). The first environment in which the child experiences sport activity is the family. Parents should guide their children through their own positive attitude towards sport activity and active lifestyle. Organized and professionally lead sport activity is recommended, especially when parent don't have enough time or knowledge. The subject sample consisted of 100 parents (average age  $33,0 \pm 5,1$ ) of kindergarten children (average age  $3,9 \pm 1,1$ ). The children attended three different kindergartens in Kočevje, Slovenia. Data were collected through the survey questionnaire in autumn 2009. On a scale from 1 to 5 (1 standing for completely unimportant motive and 5 for very important motive) the respondents (parents) ranked 30 proposed motives in the term of importance. The most important motives for engaging children in sport programs were by their parents opinion that children *had fun* (4,71), that they *achieved physical fitness and health* (4,6), that they could *express their skills* (4,5) and *learn new skills* (4,5). Results of research indicated that parents are aware of important influence of sport activity on child's development, special on motor development. They are aware of how important is that children like sport and should have fun doing it. They think that at sport activity children should also develop their motor abilities, perfect their skills, learn new skills, relax energy, meet new friends, gain self confidence, learn fair play etc. Unimportant motives were to *gain awards* (2,2) and to be *popular* (1,9).

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## **EFFECTS OF THE PROGRAM OF WATER POLO SCHOOL ON TRANSFORMATION PROCESSES OF MOTOR CAPABILITIES OF BOYS**

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Motor capabilities influence efficiency of human movement. Additional physical activity in the form of systematic training, according to the majority of research reports to date, produces positive effects on motor capability of children. The question is to what extent the activities in water environment influence the basic motor capabilities on dry land. The goal of this research was to determine the effects of the program of water polo school on motor capabilities of boys at the age of 12. Testing was performed on the sample of 56 boys from the Sarajevo primary schools, in the age of  $12 \pm 0.9$  years. The examinees were divided into two subsamples, experimental group of water polo school ( $n=21$ ) and control group of boys not active in sports ( $n=35$ ). In addition to regular school classes of physical education, experimental group also attended water polo school, while the control group attended only regular schools physical education classes, without additional sport activities. A total of 13 motor capability tests have been applied. Discriminative analysis on univariate and multivariate levels was used for analysis of quantitative values of variables and their mutual relations. Analysis of variance demonstrate that the experimental and the control group statistically differ significantly in multivariate space of analyzed variables for estimation of basic motor capabilities ( $p=.000$ ). Also, test results demonstrate that resulting discriminative function significantly differentiates between the trainees of water polo school and non-sportsmen with canonical correlation of .777. Results of T-test for independent samples demonstrated statistically significant difference in tests in which explosive strength is estimated (long jump  $p=.0002$ ; high jump  $p=.0016$ ), speed of individual arm movements (tapping  $p=.0416$ ), coordination (agility in the air  $p=0.0072$ ; sidesteps  $p=.0075$ ), flexibility (lateral leg flexibility  $p=.0008$ ), balance (beam balance with both legs  $p=.0010$ ). In the tests of sprint speed and repetitive strength, no statistically significant differences were observed between the experimental and control group. It can be concluded that program of water polo school has significantly influenced transformation processes. The research has shown that the trainees in the water polo school in the course of one-year program significantly improved their basic motor capabilities compared to the peer group which did not practice sports.



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## **INFLUENCE OF WEIGHT STATUS ON FUNCTIONAL CHARACTERISTICS OF ITALIAN SCHOOL CHILDREN (12-13 YEARS)**

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The performance levels achieved in different motor skills change from early childhood through adolescence. Motor and strength performance are related with body size and composition. In particular, weight status have important implications in affecting the performance. Aim of this study is to evaluate the motor performance in children of different gender, age and weight status. The sample included 391 children (M 193; F 198) from Bologna, Emilia-Romagna, Italy, aged 12-13 years. Height and weight were measured and the BMI was derived. BMI was categorized into normal, overweight and obese using International Obesity Task Force (IOTF) thresholds for gender and exact age. The following tests were carried out: sit and reach (SR), backward dynamic balance walking on a square beam (BDB), 10-m dash run (DR), hand grip (HG), standing broad jump (SBJ), sitting basketball throw (SBT). Three way ANOVA was used to analyze the differences in each performance test between genders, age and weight status group. Gender differences ( $p < 0.01$ ) were found in all the motor tests except balance test. Females performed better in SR, males in all the other tests. Age and weight status differences were observed for SBT, SBJ, HG and DR. Overweight subjects performed better than their counterparts in SBT and HG. The SR and BDB showed no significant differences ( $p > 0.01$ ) among any groups according to the considered classifications. Differences among age, gender and weight status were noted in tests requiring both absolute (handgrip and throw) and relative (speed run and standing broad jump) strength. Overweight subjects obtained better results in upper limb strength tests, and worse results in weight-bearing tests. Flexibility and coordination tasks (BDB and SR) did not show significant differences according to age and weight status. In conclusion, weight status influences functional characteristics requiring strength, but are not related to balance and flexibility.

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## **HIGH SCHOOL RUGBY PLAYERS PERCEPTION OF COACHING EFFECTIVENESS**

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The quality of coaches at school level has long been debated. Some authors warned that the efficiency of school coaches should be monitored due to the fact that these coaches are considered to be influential individuals in the athletes' lives. The aims of this study were therefore firstly to determine the players' perceptions of their respective rugby coaches' coaching effectiveness and secondly, to determine the difference between big and small schools of the players' perception of their respective rugby coaches coaching effectiveness. Four hundred and seventy six rugby players from twenty two schools were asked to fill in the adapted version of the Coaching Efficacy Scale. The CES consists of four subscales measuring motivation (7 items), game strategy (7 items), technique (6 items) and character building (4 items). Each item was rated on a 9 point Likert scale from 0 (not at all effective) to 9 (extremely effective). The purpose of the questionnaire was thoroughly explained to the players and participants were repeatedly reminded of the anonymous nature of the questionnaires. According to the descriptive statistics all the bigger schools tested average for all the subscales (game strategy = 6.89, technique = 7.1 and character building = 6.98) except for motivation which tested below average (5.85). The smaller schools however tested all below average for all four constructs (motivation = 4.77, game strategy = 5.86, technique = 4.68 and character building = 5.39). The results of the independent t-test indicated no statistical significant differences between the perceptions of players of big and small schools with d-values of 0.016 for motivation, 0.021 for game strategy, 0.001 for technique and 0.075 for character building. Players therefore perceive their respective coaches to perform below average on the four tested constructs. There are also no practical significant differences between the perceptions of big and small schools players on the effectiveness of their respective rugby coaches. The results of the study might clarify whether volunteer rugby coaches in high schools are effective according to their athletes' perceptions and may also help schools to evaluate their coaches and implement programs to develop more effective coaches.

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## **ANALYSIS OF CHILDREN'S INJURIES SUSTAINED DURING KINDERGARTEN SPORT ACTIVITIES**

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The study aimed to analyse children's injuries sustained during organised and unorganised sport activities in kindergartens in Ljubljana, Slovenia. We aimed to establish whether there were any gender differences in the frequency of sustaining injuries. The sample of subjects consisted of 178 parents of 3- to 6-year-old children (the sample comprised 48.3 percent male and 51.7 percent female subjects). The data were processed with the SPSS statistical software package, the frequencies were calculated and a Chi-square test performed. It was established that in the year preceding the date of the survey 26.4 percent of the children in kindergartens were injured, most of them only once. The number of injuries was statistically significantly higher for boys than for girls. As many as 60 percent of children in kindergarten engage in organised sport activities only once a week, more than one-half in a playroom and one-quarter even in a hallway. Three-quarters of children sustained an injury during free play, mostly in an open-air playground. More than one-half of the injuries sustained during an organised sport activity took place in a playroom and a good one-third in a hallway, mostly due to an unexpected situation. The injuries mostly included contusions; the head was most frequently injured. One-quarter of the injured children were taken to a hospital emergency room; in most cases the teacher informed the parents about the accident, applied a compress to the contusion or in some cases bandaged the injury or applied some cream. A written record of the accident was only prepared for a good one-third of cases. It was established that many factors influenced the prevention of injuries. These include the responsibility of the kindergarten (sport programmes, professional qualifications of teachers etc.) and others (e.g. material conditions) of the local community. Therefore, concerted action is required to achieve positive changes for the benefit of children and adolescents.

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## **PEOPLE'S ATTITUDE TOWARDS THE JOINING OF INDIVIDUALS WITH MENTAL RETARDATION IN MARTIAL ARTS**

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Statements, ideas, and prejudices have formed throughout time an impact on the way we think and act in everyday situations. The purpose of this research was to find out what the participants think about the participation of individuals with mental retardation in martial arts. It is a subject that just a short time ago was still not accepted by both, the narrow and wide professional field. Nevertheless judo became an official discipline in Special Olympics, and nowadays individuals with mental retardation all over the world are engaged in judo trainings and competitions. People's attitude towards the participation of individuals with mental retardation was analyzed through an internet survey on a sample of 1877 participants (46% were men and 54% were women; the average age was 32.6 years). We had gone over some of our initial assumptions regarding the participation in martial arts of individuals with mental retardation by using the basic statistical parameters, chi-square, t-test and variance analysis. Results have shown that the majority of the participants (87.7%) are aware of the importance of sporting activities in everyday life of individuals with mental retardation, therefore they also support it. 11% of the participants would not recommend sporting activities, whilst 4.7% of the participants would not recommend participating in any kind of hobby/activity (art classes, singing classes, theatre, sport's activities, etc. ). Among sporting activities the participants found trekking and walking, ball games, swimming, dancing and athletics as the most appropriate. Martial arts took the 6th place, where 7.6% of the participants thought they are the most appropriate because of their variety, while 23.3% thought that martial arts are inappropriate for individuals with mental retardation. 30.8% participants thought that individuals with mental development deficits are more inclined to injuries, 43.3% thought that these individuals have a harder time managing their aggression when compared to normal population. There were no differences in age or degree of education among the participants that support the participation of individuals with mental development deficits in martial arts. There were however some differences in the support of martial arts depending on sex and prior engagement in martial arts. The 46% of the participants thought that individuals with mental retardation should be included in the regular programs, which would make integration, destigmatization and normalization of these individuals much easier. In addition they also thought that positive outcomes could be noticed in the rest of the popu-



lation. On the other side, the 29.5% of the participants thought that individuals with mental retardation should train separately. According to the results of the survey we could assume that the participation of individuals with mental retardation in martial arts and acceptance of diversity in the wider meaning is a big achievement and proof of our society's maturity. The fact that only 9.4% of all participants oppose judo competitions in the Special Olympics is proof that the effort of some sport's visionaries, who insisted on their vision of including individuals with a mental retardation in the training process of martial arts was correct, despite all the misunderstandings of both professional and laic public.

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# **THE RELATIONSHIP BETWEEN ORGANIZATIONAL JUSTICE AND ORGANIZATIONAL EFFECTIVENESS PERCEIVED BY SPORT CENTER EMPLOYEE**

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In order to successfully and effectively manage a sport center, manager or director of the sport center should recognize their employees as their internal clients and support them without passive perception toward their employees. In other words, efficient human resource management is a very important task to develop the effectiveness in the organization and achieve their goals. In this context, proper understanding of organizational justice of sport center employees will result in an effective human resource management while developing organizational effectiveness. Therefore, this study is to examine the relationship between organizational justice and organizational effectiveness perceived by employees. Sport center employees who are working in Seoul were subjected to questionnaire and based on simple random sampling, total of 350 are collected from employees from 16 different sport centers. Among the collected data 332 were used for practical analysis. Based on the theories and precedent studies of various useful academic disciplines, questionnaire consists of 4 individual characteristics of sex, age, educational background, and job position, organizational justice using questionnaire from Lee Byung Kwan, and organizational effectiveness using questionnaire from Kim Soon Ha. By utilizing SPSSWIN 17.0, multiple regression analysis is implemented. Distributive justice that is sub-factor of organizational justice influences on job satisfaction and organizational commitment while procedural justice only influences on organizational commitment. In addition, explanatory power of job satisfaction toward organizational justice variables is 50.5% while that of organizational commitment is 12.6%. Organizational justice perceived by sport center employees influences organizational effectiveness, i.e., sub-factor of organizational justice, distributive justice influenced job satisfaction and organizational commitment, while procedural justice, which proved to be also a sub-factor of organizational justice, only influenced organizational commitment.

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