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ABSTRACTS

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COMPARATIVE STUDY OF BODY COMPOSITION, FLEXIBILITY, MUSCULAR STRENGTH AND MUSCULAR ENDURANCE BETWEEN BODYBUILDERS AND POWER LIFTERS

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Introduction: Sport has a very prominent role in the present modernized society. By nature sportsmen are competitive for excellence in their performance and aims to win over other opponent. Winning in a sport is not a luck or chance or gift, one has to work hard systematically and understand his strength and weaknesses to achieve his goal. Body composition can be measured in several ways, through caliper to measure the thickness of subcutaneous fat in multiple places on the body. These measurements are then used to estimate total body fat with a margin of error of approximately four % points (Voorhees, 2007). Flexibility is the range of motion around a joint, good flexibility in the joints helps in preventing injuries in all stages of life (Johnson & Nelson, 1998). Muscular strength is the ability of the muscle to exert force during activity (Mathews, 1981) .Muscular endurance is the ability of the muscle or group of muscles to overcome or to act resistance for longer duration under conditions of fatigue or tiredness (H. Singh, 1991). The purpose of this present study was to compare the body composition (percentage of body fat), flexibility (hip & trunk flexibility), muscular strength (bench press 1RM) and muscular Endurance (push-ups test for 30 sec) between state level Bodybuilders and power Lifters.

Method: Sixty (60) males participated at state level, Bodybuilders (N=30) and power lifters (N=30) ranging between 18 to 22 years were selected randomly from different colleges of Osmania University, Hyderabad, India for this study. To compare the mean differences between the state level bodybuilders and power lifters, mean, S.D and t-tests were computed using Statistica Software.

Results and Discussion: Body composition (percentage of body fat), Flexibility (hip & trunk flexibility), muscular strength (bench press 1RM), and muscular endurance (push-ups test for 30 sec) were found to be statistically significant. The mean and S.D of the bodybuilders and power lifters for body composition were (16.36, 2.28) and (19.73, 1.77). Regard to flexibility the Mean and S.D between the bodybuilders and weight lifters were (23.90, 4.26) and (17.53, 4.79) Mean and S.D between the groups regard to muscular strength were (77.66, 14.94) and (84.50, 16.62). Mean and S.D between the bodybuilders and weight lifters regard to muscular endurance were (24.47, 2.29) and (17.10, 3.80) respectively.

Conclusion: It is concluded that there is a significant difference in body composition of bodybuilders and power lifters. The trunk & hip flexibility of bodybuilders and power lifters differ significantly. With regard to muscular strength both the groups differ significantly. Lastly with regard to muscular endurance between both the groups showed significant difference. Further more it is also concluded that the power lifters had shows better performance than their counter part with regard to muscular strength. Bodybuilders had shown greater performance with regard to body composition, flexibility, and muscular endurance.

Key words: Body composition. Flexibility, Muscular endurance, Muscular strength

STUDENT HEALTH EHANCING PHYSICAL ACTIVITY IN LEISURE TIME

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The analysis of student lifestyle research shows that the researchers investigate the influence of physical activities on students' health and reveal the negative effect of physical inactivity on health (Poteliūnienė et al. 2010). However, the problems of physical education in universities are solved perfunctorily. In recent years, young people of increasingly poor health enter Lithuanian universities (Grabauskas,V. et al., 2009). Universities have to develop, deepen and to give a meaning to healthy lifestyle continuity in the context of the whole life. **The problem of the research is** how students assess their health; what the expression of students' physical activity in their leisure time is. **The purpose** is to investigate the students' opinion about their health, physical activity and its expression in their leisure time. **The methodology and organization.** Methods of the research are analysis of scientific literature and statistical data; written survey. The research was conducted in 2011. 201 full-time first year students (98 female students and 103 male students) of Klaipeda University took part in this research. The majority (97.5 %) of the surveyed students were 19-21 years of age. The International Physical Activity Questionnaire supplemented with questions about health was used. The data was investigated using the software package SPSS for Windows13.0 of statistical data analysis. To evaluate the reliability of the statistical data, chi-square criterion was applied. The difference was considered reliable with not more than 5% error ($p < 0.05$)

The results. Our research showed that fewer than half of the students consider themselves healthy (48.5 % of male students and 40.8 % of female students) and 45.6 % of male students and 56.1 % of female students consider themselves not quite healthy. Information about health is mostly received from mass-media (42.7 % of male students and 32.7 % of female students), a great deal of information female students get from their parents (27.6 %) whereas male students receive it from medical workers (26.2 %). 9% of the knowledge is provided by university teachers. Only half of our respondents (48 % of female students and 54.4 % of male students) believe that they have enough knowledge about physical activity. The main sources of information about physical activity are mass-media (33.7 % female students and 35 % male students), medical workers and parents. The research done by E.Grinienė (2006) showed that the more students know about healthy lifestyle the more they are physically active. Only a part of students (24.3% of male students and 6.1% of female students) have formed a positive attitude towards morning exercise and practise it daily. 29.1% of male students and even more female students (36.7%) never exercise. The biggest amount of time the students devote to physical activities is 1-2 hours per week (28.6 % of female students and 25.2 % of male students). Approximately every fourth female student devotes to that only 1 hour per week, and slightly more than every fifth male student exercise 3-4 hours per week. A small number of male students (11.7 % and 18.4 %) and very few female students (4.1% and 6.1%) exercise 5-6-7 hours per week. The surveyed students who exercise at least 3-4 hours per week or more assessed their health as good more often than the students who exercise less or not at all ($p<0,05$). Female students (38.8 %) usually exercise because they want to lose weight or have a beautiful body (30.6 %). Male students do exercises because they want to improve their physical capacity (29.1%), have a beautiful body (19.4%), be healthy (16.5%) and experience pleasure (17.5%). The research suggests that the motivation of university students to do sports should be developed so as to enable an individual engaged in mental work to focus on the holistic development of their personality maintaining balance between mental work and physical activity.

Conclusions. The research showed that most students consider themselves adequately or completely healthy. Approximately every tenth student often and half of the students sometimes feel one or another psychosomatic ailment. The majority of the first year students exercise 1-2 hours per week, therefore they fall under health risk factor because of physical inactivity.

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NATIONAL SOCIAL POLICY OF EMPLOYMENT AND VOCATIONAL TRAINING IN THE CONTEXT OF THE CONVENTION ON THE RIGHTS OF PERSONS WITH DISABILITIES (CRPD) AFTER RATIFICATION.

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Lithuania in 2010.05.27 ratifying the CRPD (2006) legally validated the principles of non-discrimination, full and effective participation (mainstreaming), equality of opportunities and individual choices of disabled in the areas of inclusive employment (IE) and vocational training (VT), recognizing the right of disabled for effective access to general VT, freely chosen work, promotion of employment in public and private sectors, equal value and remuneration of disabled in labor market.

Our previous investigations in 2008, before ratification, have revealed[1] the VT of disabled having been legally separated from mainstreaming, informal and not useful for labor market, resulting segregated employment of disabled in 'social enterprises' under the almost absolute financing by national budget that could be named as "*national charity"* to show imaginary employment of disabled in labor market, that by other sources[2] was named as "*sheltered employment*" being twofold conceivable from medical therapeutic or some social aspects. The employment of the disabled through offering governmental wage allowances in sheltered workshops or enterprises, separated from real labor market, enable them to perform so-called "dirty work" that able-bodied don't want to do[3]. Such an employment in much of the work offered could be degrading, stigmatizing and damaging for self-esteem of disabled. A new disability rights paradigm of CRPD provides the disability scholars and advocates with substantial scope for interpretation of existing rights in either an inclusive or an exclusive manner, necessary to base arguments for reforms[4] of state disability policy and particularly of disability employment and VT one. The national disability policy reform is necessary in order to implement the equal opportunities of disabled to exercise their rights as others without discrimination and maximizing social inclusion according to CRPD.

The purpose of the study was to ascertain the national disability policy change one year before and after ratification of CRPD in the areas of vocational training and employment, national financial resources spent and the level of participation of disabled in monitoring the changes. For investigation there was used **the method** of Qualitative content analysis[5] of Lithuanian legal acts as well as statistics regarding the conventional inclusive measures in research field.

The results couldn't indicate any appropriate modification or abolition of existing lows or regulations in order to combat discrimination and exclusion of disabled from mainstreamed labor market and general vocational and continuing training (VT) system. Such an exclusive policy being performed in 2008[1] lasts up to now and large amount of financial resources from national budget and European funds has been spent. The existing legal acts don't ensure the right of disabled to participate in governance of creating the new disability policy in conformity with CRPD .

In **conclusion,** the actual Lithuanian disability policy is working against the inclusive employment and VT of disabled and doesn't meet the requirements, regarding general obligations of Lithuania, as a State Party, after ratification of CRPD.

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EFFECT OF CAFFEINE INGESTION ON WRESTLING-SPECIFIC PHYSICAL PERFORMANCE

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It has been reported that there is a tendency among wrestlers to use caffeine as an ergogenic aid (1). However, to the best of our knowledge, the effect of caffeine ingestion on wrestling-specific physical performance has never been studied. The aim of this experiment was to elucidate the potential effect of caffeine on physical performance in wrestlers. Fourteen wrestlers completed two series of an upper body intermittent sprint performance (UBISP) test (2). In both series, four 6-min UBISP tests performed with 30 min recovery periods between the tests simulated an ordinary competition day in Submission Wrestling and Brazilian Jiu Jitsu. Each UBISP test consisted of six 15 s periods of maximal intensity arm-cranking exercise against resistance of 4% body mass interspersed with 45 s intervals of low-speed cranking with no resistance. One series of UBISP tests (CAF) was performed with preceding caffeine (5mg/kg) and the other (PLC) with placebo (glucose) administration in a randomized, double-blind, crossover manner. In the CAF trial compared to PLC, lower peak power in the 4th UBISP test was observed (-5.9 %; $p = 0.041$). Moreover, peak power decreased from the 1st to the 4th UBISP test in the CAF trial (-7.2 %; $p = 0.004$) but did not change in the PLC trial. Mean power decreased from the 1st to the 4th UBISP test in both the CAF (-10.6 %; $p = 0.005$) and PLC (-19.0 %; $p = 0.001$) trials, no between-trial differences were observed. At the end of the 30 min recovery, heart rate (after the 1st, 2nd and 3rd UBISP tests) and blood lactate concentration (after the 2nd and 3rd UBISP tests) were both ($p < 0.05$) higher in the CAF compared to the PLC trial. No between-trial differences in ratings of perceived fatigue before and ratings of perceived exertion immediately after each UBISP test were observed. We conclude that caffeine had a detrimental effect on upper body intermittent sprint performance in trained wrestlers in simulated competition day conditions. Elevated recovery heart rate and blood lactate concentration in the CAF trial compared to the PLC suggest that caffeine ingestion was related to impaired recovery between the consecutive UBISP tests.

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FOOT ARCH CHARACTERISTICS AND FOOT STRENGTH OF HABITUALLY BAREFOOT VERSUS SHOD CHILDREN IN RURAL KENYA

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Running barefoot or in minimal footwear may protect the feet and lower limbs from impact related injuries. Our hypothesis was that habitually barefoot children have stronger feet muscles than children who are daily wearing shoes. This study investigated foot characteristics, foot strength and arch stiffness in 38 habitually barefoot (HB) children (age 15.1 ± 1.4 yrs (mean ± SD); weight 44.9 ± 7.4 kg) and 38 age-; gender- and weight-matched controls (CON) (age 15.1 ± 1.4 yrs; weight 45.3 ± 6.9 kg) in rural Kenya. Foot dorsum height at 50% of the foot length was assessed by ruler and segmometer. The arch height index (AHI; dorsum height measured at 50% of the total foot length and divided with truncated foot length) was used to characterize the arch height (1, 2). The arch stiffness was calculated according to Zifchock *et al* (2) as a 40% change in load from seated to standing. Toe flexor and foot shortening strength were measured using a foot strength device (TKK 3360, Takei, Japan). A lower limb injury questionnaire was administered. Foot dorsum height and dorsum height divided by foot length were higher in HB (seated: 6.72 ± 0.68 cm vs 6.23 ± 0.54 cm, $p<0.01$; 0.28 ± 0.03 cm vs 0.26 ± 0.03, $p<0.01$; standing: 6.48 ± 0.64 cm vs 6.07 ± 0.46 cm, $p<0.01$; 0.27 ± 0.03 cm vs 0.26 ± 0.02, $p<0.01$;).AHI was higher in HB (seated 0.40 ± 0.04 cm vs 0.36 ± 0.03 cm, $p<0.01$ and standing 0.39 ± 0.04 cm vs 0.35 ± 0.03 cm, $p<0.01$). Arch stiffness was higher in CON (2207.2 ± 914.8 kg/cm vs 1427.7 ± 804 kg/cm, $p<0.001$). While hallux flexion strength (4.9 ± 2.3 kg vs 4.8 ± 2.1 kg, $p=0.90$) and flexion in 2-4 toes (3.3 ± 1.5 kg vs 2.8 ± 1.4 kg, $p=0.10$) were not different between groups, flexion in 1-4 toes (9.1 ± 2.5 kg vs 7.9 ± 2.6 kg, $p<0.05$) and foot shortening strength (4.8 ± 1.9 kg vs 3.5 ± 1.8 kg, $p<0.01$) were significantly greater in HB. Lower limb injury prevalence in the past one year was 8% in HB and 61% in CON (OR=17.9, $p<0.01$). Habitually barefoot children had higher and more flexible medial longitudinal foot arch. Intrinsic foot muscles were comparatively stronger in HB and they maintained less stiff arch compared to CON. This study does not support the hypothesis that increased arch flexibility is related to soft-tissue injuries of the foot and ankle. Arch stiffness is positively correlated to foot shortening strength in HB ($r=0.38$; $p<0.05$). There were no significant correlations between arch stiffness and arch height index in both groups, only negative correlation was found between arch stiffness and arch height index in CON ($r= -0.4$; $p<0.05$).

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PHYSIOTHERAPHY INDUCED CHANGES IN MUSCLE RATE OF FORCE DEVELOPMENT IN HEALTHY AND WITH ACHILLES TENDON RUPTURE SUBJECTS

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Achilles tendon rupture (ATR) may affect the biomechanical behaviour of the muscle – tendon unit[1,2]. The ability to develop muscle rate of force development (RFD) may be important factor to perform other tasks of daily life[2]. Most of the studies analyse the effect of immobilization on skeletal muscles is based on patient recovering from anterior cruciate ligament reconstruction. But there is lack of information about RFD changes after prolonged time of immobilization for patient after ATR. THE AIM of this pilot study was to reveal following questions: (1) if there are triceps surae muscle (TSM) RFD changes after four and eight weeks eccentric muscle training programme for healthy and ATR subjects; (2) if there are TSM RFD differences between dominant (DL) and non-dominant (NDL) as well as injured (IL) and non-injured (NIL) legs (3) if there is differences between dominant and non-injured leg as well as non-dominant and injured legs. METHODS: all male subjects were divided into 2 groups: first group consisted of 4 healthy (age 25±4 yrs); second group consisted of 4 ATR (age 32±3 yrs.). Before the study, all ATR participants were after 6 weeks (wk) surgery and immobilization also 10 rehabilitation procedures. Both groups performed task accordingly with DL and NDL; IL and NIL. TSM RFD was measured in seated position with hip flexed 75, knee – 35 and at -15; 0; 15 ankle angles. TSM maximal voluntary isometric contraction was established during 8 seconds, RFD was indicated as the slope of the initial phase of the force-time curve at 30; 50; 100; 200 ms relative to the onset of contraction. The DL and NIL was tested first to increase subjects comfort with procedure. TSM training programme consisted eccentric exercises (3 times/wk). The significance level of differences between legs (DL and NDL; IL and NIL), also time (before and after 4; 8 wk) was set at $p<0.05$. RESULTS: <u>at -15° ankle angle</u> there was difference ($p<0,05$) between DL and NDL at 30ms after 4 and 8 wk PT. In healthy NDL group was difference ($p<0,05$) in 200ms before and after 8 wk PT. In ATR NDL group were difference ($p<0,05$) in 30ms before and after 4; 8 wk PT and at 200ms before and after 4 wk PT. In ATR IL group was difference ($p<0.05$) in 50 ms before after 8 wk PT. Compared results between both groups, were differences ($p<0.05$) between DL and NDL at 30ms after 8 wk PT, also differences ($p<0.05$) between NDL and IL at 200 ms after 4 wk PT. <u>At 0° ankle angle</u> there was difference ($p<0.05$) between D and ND leg at 30ms; 50ms; 100ms 200 ms after 4 wk PT. In ATR group difference ($p<0.05$) between IL and NIL at 100 ms after 4 and PT. In ATR NIL group were differences ($p<0,05$) at 50ms, 100 ms, 200ms after 4 wk PT, and 30ms, 50ms, 100 ms, 200 ms after 8 wk PT. Also in IL at 30ms after 4 wk PT and 30ms, 50ms, 100 ms, after 8 wk PT. Compared results between both groups, were differences ($p<0,05$) between NDL and IL at 50ms,100 ms before PT. <u>At 15° ankle angle</u> there was difference ($p<0,05$) between DL and NDL at 50 ms before and after 4 wk PT. Also in ATR group at 100 ms after 4 and PT between IL and NIL legs, and 200 ms after 8 wk PT between IL and NIL. In ATR IL group was established difference ($p<0,05$) in 100 ms before after 4 and 8 wk PT. Compared results between both groups, were differences ($p<0,05$) between NDL and IL at 200 ms after 8 wk PT. The main findings of our study are: (1) 4 and 8 wk PT had greater ($p<0,05$) influence for TSM RFD changes to ATR group IL and NIL then to healthy group DL and NDL; (2) differences between DL and NDL were at -15°,15° before and after 4 wk PT, at 0° after 4 wk PT, also between IL and NIL at 15° after 4 wk 8 wk PT, at 0° after 4 wk PT; (3) differences between DL and NDL were at -15°,15° before and after 4 wk PT, also differences between NDL and IL at -15°,15° after 4 wk and 8 wk PT.

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EXPRESSION OF KAYAK AND CANOE ROWING COACHES' PROFESSIONAL COMPETENCES IN ELITE ATHLETES' VIEW

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A coach is a key to developing an athlete's career and one of the most important factors in his/her success. Athletes' perceptions and evaluations of a coach's competencies are believed to play a critical role in coaching effectiveness (Myers et al., 2006). Solomon (1999) states that athletes are capable of evaluating coaches' personalities and behaviors related to the coaching role. Athletes seem to recognize the value of coaching evaluations and are capable of identifying competencies which they perceive to be important to a coach's performance (Kuga, 1993).

The **aim** of this work was to disclose expression of coaches' professional competences needed for elite athletes' development using analysis of elite athletes' interrogation data. The selection of the research was critical. The participants of the research were Lithuanian Olympic kayak and canoe rowing team members and candidates (n=22; 20–35 years of age), champions and prize winners in junior, youth and adults World and Europe championships (in various boats classes).

Questionnaire for professional competences evaluation was applied (Santos et al., 2010). The model of the questionnaire was made up of 23 statements, split into three groups of competences: competences related to annual and multiannual planning, competences related to practice and competition orientation, and personal and coaching education competences. The items were answered on a 5 point Likert type scale from 1 to 5. To establish homogeneity of professional competences evaluation scale content, test on questionnaire inner compatibility was performed (*Cronbach* α–0.973). Descriptive statistics methods were applied for data analysis.

The **results** of the research showed that the athletes gave the highest evaluation for their coaches' competences related to practice and competition orientation (3.98), as well as for competences related to annual and multiannual planning (3.88), while personal and coaching education competences received lower evaluation (3.65; $p<0.05$). Analysis on coaches' annual and multiannual sport process planning competences indicated that, according to the athletes, the best coaches' abilities are preparation and implementation of annual and multiannual sport preparation plan, as well as combination the preparation program with competitive strategy (4.05). Analysis on coaches' competences related to practice and competition orientation showed that athletes gave the highest evaluation on coaches' ability to prepare an athlete for competition (4.32); coaches' organizational abilities, such as ability to organiz e training workouts and manage them, to flexibly adapt training workout content to changing situations, to lead the activity of athletes during the competitions, providing specific for certain sports directions were also evaluated on a high scale. It was also observed that the coaches' ability to prepare and carry out annual and multiannual sport preparation program with regard to individual athlete's abilities (3.77) and to plan training practices in respect to individual athlete's possibilities was evaluated as not enough developed ability (3.68). Personal and coaching education competences analysis demonstrated that from all abilities in this group, athletes gave priority to coaches' collaboration competence, i.e., discussing new ideas and searching for the ways to solve the problem together with an athlete (4.14). Rather high evaluation was given for coaches' sense of responsibility in their work with athletes.

Keywords: *kayak rower, canoe rower, perceived coach's competences, elite athlete*

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$\dot{V}O_2$ DURING HEAVY CYCLING INCREASES 45 MINUTES AFTER DROP JUMPS IN MEN BUT NOT IN WOMEN

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Prior eccentric or eccentric – concenaric exercise (ECE) induce long lasting (within 24 – 48 h of recovery) delayed onset muscle soreness (DOMS) and muscle fatigue with concomitant signs of muscle damage (Skurvydas et al., 2007). The residual effect of prior ECE on $\dot{V}O_2$ during constant cycling exercise (CCE) remains equivocal. Increased $\dot{V}O_2$ during steady state phase of CCE in men (Ratkevičius et al., 2006) and of moderate intensity running in women (Zaičenkovienė and Stasiulis, 2010) performed one hour after prior ECE has been reported. On the contrary no changes in $\dot{V}O_2$ have been observed 48 and 72 h after prior ECE in men (Schneider et al., 2007). We could not find neither data about the residual effect of prior ECE on $\dot{V}O_2$ during CCE in women nor data about differences of such effect between genders. The aim of the study was to asses differences of the residual effect of prior drop jumps (PDJ) on $\dot{V}O_2$ during heavy cycling exercise (HCE) and indirect muscle damage parameters between men and women. On four different days men (n = 8) and women (n =11) participants performed one increasing cycling exercise (ICE) and three HCE (control (CON), 45 min (45'PDJ) and 24 h (24 h PDJ) after 100 drop jumps). The intensity of HCE was set to work rate corresponding to 50 % of the difference between second and first ventilatory thresholds which were determined using pulmonary gas exchange parameters during ICE. The cadence was 70 rpm. 100 PDJ were performed as a prior eccentric – concentric exercise from a 0.47 m stage with 20 s of recovery between every drop jump. Pulmonary gas exchange parameters were continuously recorded during ICE and HCE. Capillary blood samples were collected in order to measure blood lactate concentration immediately after HCE and serum creatine kinaze (CK) activity 24 h after PDJ. Subjects rated perceived exertion and DOMS using 20 and 10 points scales, respectively.

$\dot{V}O_2$ at 3-6' min of HCE performed 45 min after PDJ was significantly increased as compared to CON HCE only in men group. Both men and women felt moderate muscle pain. The serum CK activity was statistically higher in men (600.4 (350.2) $U \cdot L^{-1}$) then in women (306.2 (281.2) $U \cdot L^{-1}$) 24 hours after PDJ. The significant positive correlation between muscle pain and CK activity in women (r= 0.83) and in men (r= 0.93) was observed.

In summary, prior eccentric-concentric exercise of thigh muscles (100 drop jumps) had residual effect on $\dot{V}O_2$ during steady state of HCE performed 45 min after PDJ in men, with no significant changes in women. Plazma CK activity was higher in men then in women 24 h after PDJ.

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PHYSICAL EDUCADION IN RUSSIA IN THE BEGINNING OF THE XX-TH CENTURY (ON THE EXAMPLE OF THE PSKOV PROVINCE)

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The revival of public interest to problems of physical training of rising generation was outlined in the beginning of the XX-th century in Russia. The variety of the advanced schools appeared where to questions of the considerable attention of correct physical development of youth was paid. The work with unpublished documents from funds of the State archive of the Pskov area has allowed to find out, how physical training in Russia in the beginning of the XX-th century (on an example of the Pskov province) was organized. The leading place in system of pre-revolutionary education of the Pskov province was occupied with the Pskov man's grammar school which was the advanced educational institution on the organization of pupils' physical training. The merit in it belonged to the director of a grammar school of Arthur Gotlib. A.Gotlib was one of the theorists and experts of that time in the field of physical training. In 1909 he published the brochure «Physical training on sokol system at high school». In 1912 A.Gotlib addressed to congress of directors of St.-Petersburg educational district with the report «About physical training at high school». Firstly, the gym was built, then, the gymnastic devices were bought. And at last B.Sedljachek the Czech "sokol" was invited. He had been practising as a gymnastic teacher in high schools of Russia for two years. It is necessary to notice that the gymnastics on sokol system began to be taught as an obligatory subject in six classes. There were 2 lessons a week in grades from the 1^{st} to the 4^{th} during the school time. The total number of hours was 20. At the initiative of the director of a grammar school the Pskov society to assistance of corporal education of studying youth was organized. Thanks to that the grammar-school boys had an opportunity to practise various sports: rowing, football, skating and skiing. At the initiative of A.Gotlib and under the leading of gymnastics teacher of V.Sedljachek the circle of persons was organized in the end of 1911. The main members of it were clerks of governmental organizations. As the number of participants of a gymnastic circle was increasing, a necessity to organize a society appeared. The charter of the Pskov gymnastic society Sokol was confirmed by the Pskov governor on April, 21st, 1912. Members of a circle and the Society brought a payment for hall illumination, repair of a gym and devices. On June, 1st, 1912 the director with pupils were invited to Petersburg for participation in the Highest performance of gymnastics. 14 capital grammar schools and two provincial – Pskov and Narva participated in it. The Pskov participants were permitted to present 33 pupils in connection with good preparation. Participants of show in the presence of emperor Nikolai II did free exercises, exercises on devices, pyramids and passed a ceremonial march. During the performance of exercises the emperor paid attention on Pskov athletes, having stated them his approval, and had a long conversation with the director of a grammar school of A.Gotlib, asking about the main points of teaching

of gymnastics in the educational institution. Besides, for 22 pupils of a grammar school educational trip abroad was organized (from June, 11 till June, 28th, 1912). The excursions were headed by the director, the inspector of educational district helped him. The trip purpose was visiting of the Sokol meeting in Prague and sights and museums in Prague, Dresden and Berlin. In Prague tourists took part in gymnastic show together with other Russian grammar-school boys-sokols whom 200 persons gathered nearby. In one of the days the Pskov delegation visited the Olshansky cemetery where they assigned a wreath to a tomb of the Russian soldiers who were killed in Patriotic War of 1812. After survey of Prague pupils have visited Dresden and Berlin where have visited memorable places and museums. As a whole, physical training of pupils had beneficial influence. On supervision of the doctor «the percent of pupils with a good food of last years increased, and the curvature of a backbone got in a family at some pupils disappeared under the influence of physical exercises». As to moral influence, that, according to the director of a grammar school in which 485 pupils were trained, «as a result of regular training by gymnastics and sports is considerably developed at pupils boldness, discipline, attentiveness, resource and other precious qualities». These words can serve as an original result of the organization of physical training in the Pskov man's grammar school in the XX-th century beginning as in days of the First World War all sports work was changed taking into account new inquiries of the state.

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ASSESSMENT OF THE RELIABILITY OF COGNITIVE (ATTENTION AND MEMORY) TESTS

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Special neuropsychological tests, which are used to assess cognitive functions in clinical practice, are often complicated, time-consuming, demanding special knowledge and expensive; therefore, cognitive functions frequently remain insufficiently assessed. Therefore, our selected and validated tests intended for the assessment of short-term memory and attention could be successfully applied in sports and clinical rehabilitation. The aim of the research is to assess the reliability of the tests of cognitive functions (memory and attention). Research methods and investigation participants: the reliability of the tests was assessed using the intraclass correlation coefficient, which has two versions: the reliability of single assessments (*ICC single*); the reliability of assessment averages (*ICC average*) and variation coefficient (*VC*). Young and healthy students (n = 41) of Lithuanian Academy of Physical Education, aged from 18 to 30 (24.6 ± 2.3), participated in the research. The participants accomplished the tests 4 times, i.e. 2 times (with a one-hour break) on the first day (teaching) and 2 times (with a one-hour break) on the second day (reliability testing). There was a 24-hour break between the first and second day testing. The participants had to accomplish 6 tests (3 for memory and 3 for attention); the tests were presented in random order.

Research results and discussion: The results of the reliability of single assessments (*ICC single* 0.82) and reliability of assessment averages (*ICC average* 0.90) of testing *the volume of spatial memory* revealed a high ($p<0.001$) and very high ($p<0.001$) reliability of the test. Variation coefficient (-1.32 %) disclosed a very high correlation and minimal variation between the test and re-test results. The results of the intraclass correlation coefficient (ICC single 0.86; ICC average 0.93) and variation coefficient (-2.22) of the average number of guessed symbols of testing *the amount of numbers memorizing* also revealed a very high reliability of test results ($p<0.001$). The results of single assessment reliability (*ICC single* 0.68) and assessment averages reliability (*ICC average* 0.81) of testing *even number recognition* proved a very high reliability of the test ($p<0.0001$). The coefficient of the afore-mentioned test (- 1.56 %) showed very a high correlation their minimal variation between the test and test results. The results of the reliability of single assessments (*ICC single* 0.36) of testing *the memorizing of even numbers* demonstrated an average reliability of the test ($p<0.01$). It is credible that the complexity of the test determined the average and low reiteration of test results. However, the variation coefficient of the test (4.73%) showed a good correlation between test results. The results of the test of *complex reaction assessment* revealed a high reliability of single ICC (0.75) assessments and a very high reliability of ICC (0.86) average assessments ($p<0.0001$). Variation coefficient (3.05 %) disclosed a high correlation between test results. The results of the reliability (0.89) of *ICC* single assessments and *ICC* assessment averages (0.94) of testing *the search for image samples* revealed a high reliability of the test ($p<0.0001$). Variation coefficient (2.68 %) disclosed a very high correlation between test results. The results of assessing the reliability of *ICC* (0.94) single assessments and *ICC* (0.97) average assessments of testing *attention switching* revealed a very high reliability of the test ($p<0.0001$). Variation coefficient (3.74%) disclosed a high correlation between test results. The indicators of variation coefficients of all applied tests for both attention and memory testing, lower than 5%, showed a high correlation between the results of tests and re-tests with minimal variation.

Conclusion: The reliability of the tests of memory and attention assessment is high (with the exception of figure recognition tests, whose reliability is average/low); therefore, the tests are suitable to be used in sport and clinical rehabilitation practice, aiming to determine the changes in cognitive functions under the influence of external factors, e.g. cold, heat, etc.

Key words: *cognitive functions, reliability and validity of tests.*

A CHILD AS A PHYSICAL ACTIVITY STIMULATOR IN A FAMILY

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Children's physical activity depends on a variety of factors, especially on parents' and teachers' attitudes. A lot of researchers (Iannotti et al., 2005; Sigmund et al., 2008; Alderman et al., 2010) emphasise family's impact on child's physical activity. Parents can clearly have a major impact on the development of active lifestyles in their children. On the other hand, young children are more active that adult people, thus, children can stimulate their parents and other family members to increase physical activity, to spend free time more actively (Bula-Biteniece, 2011; Piech, Baraniecka, 2011). There is little research in Lithuania which analyses families', having preschool children, physical activity. **The purpose of the study** is to examine some dimensions of physical activity in families with 5-6 year-old children and physical education in the kindergarten, and to assess the effectiveness of the created educational project of physical activity stimulation in a family. The following **methods** were applied: project of physical activity stimulation in a family, survey, group conversations with children, descriptive statistics. The three- month long project was realised. 278 families with 5-6 year-old children volunteered to participate in the project. Children participated in physical education classes in the kindergarten twice a week. They learnt different tasks and games during them. The teacher continuously emphasised which tasks and games should be performed at home together with parents. Three pieces of homework were given every week.

The research data suggest that the majority of the 5-6 year-olds' parents, participating in the project of physical activity stimulation in a family, had higher education, a half of them did mental, sitting job, and only a tenth did sport systematically. The majority of their children were physically active. The majority of the parents were positive about children's physical education in the kindergarten; however, more than four fifths did not assist in organising health and sport events. The majority of the children liked physical education classes during the project of physical activity stimulation in a family, and they willingly told their family members about physical activity content. Family members mostly performed homework tasks together with the child 1-3 times a week, but not systematically. Mother or father mostly did sport together with the child. Children, who are systematically physically trained in a preschool institution, can stimulate their family's physical activity. Children liked being the organisers of physical activity in their family. During the project the children often asked their family members to perform together the tasks or games, they had learnt in the kindergarten, at home. They were able to reveal clearly to the teacher the situations of physical activity in their family. On the other hand, children are just a go between a teacher and their parents. They are unable to realise all their physical potential by themselves, defeat parents' unwillingness to do sport together, therefore, close collaboration between teachers and parents is essential. Both preschool teachers and parents should model child's physical activity, create favourable physical and social environment.

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ACTION AND COPING PLANNING INTERVENTION TO INCREASE EXERCISE HABITS: A ONE-YEAR FOLLOW UP

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Introduction. It is considered that high motivation to exercise is one of the main keys to push a person towards an exercise program. However, having motivation might not mean a person will put it into action. Indeed, even a highly motivated person may find it difficult to become a regular exerciser. To overcome this problem the volitional processes which guide a person's behavior have to be taken into account. Self-regulatory and self-control processes which are parts of volition help people to overcome internal and external barriers of their goals. Volitional strategies emphasized both action planning and coping planning have received empirical support over recent years (Gollwitzer et al., 2004; Sniehotta et al., 2006). However, previous researches applied these strategies in rehabilitation context. In contrast, a healthy individual might not see the necessity to plan their exercise and may incorporate a spontaneous action plan. Therefore, the purpose of this study was to examine the one-year effect of action planning and coping planning intervention with healthy individual.

Methods. The sample included 315 high school student (n=126 male, n=189 female). All students were assured of the confidentiality and gave informed consent. Participants completed several psychological inventories. A randomized trial was conducted including experimental and control groups. Mediators of physical activity, exercise behavior, body mass index were used as outcomes' variables. After one year the participants filled in the questionnaires again.

Results. Individuals who participated in the intervention reported increases in self-efficacy ($P<.05$), action planning ($P<.05$), coping planning ($P<.05$), relapse skills ($P<.05$). Long-term changes are associated with maintaining regular exercise participation. However, action planning and coping planning were more pronounced among those who had low level of physical activity at the starting point.

Discussion. The results indicate that action and coping planning intervention help healthy individuals to remain active one year after the intervention. This might be associated with the fact that participants significantly increased action planning skills and reduced perception of barriers to exercise which are powerful exercise predictors (Brickell et al., 2006). In line with prior research Gerber et al (2011), we found that action planning is only effective when participants report low exercise level. However, coping planning is more effective in terms of maintaining behavior for those who are regularly active. Additional researches are needed to find out the effects of action and coping planning for samples belonging to a different socioeconomic status, and organized and non-organized settings form of exercise involvement.

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THE SCIENTIFIC PRESCRIPTION OF EXERCISE FOR PRIMARY PREVENTION AND CONTROL OF MAJOR CHRONIC DISEASES

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As drugs in medicine, exercise may today be applied in the prevention and therapy of all crhonic diseases. The scientific prescription of exercise includes: molecule involved in the pathogenesis (prevention) or progression (therapy) concentration of which is necessary to increase (↑) or decrease (↓); metabolic power (E/t); time of exercise, frequency As far as metabolic power may be determined from the product energy cost (C) of the type of human locomotion (walking, running, swimming, skying, cycking, ect.. and velocity (v) = C x v. About energy cost (C) this is the result of aereodynamic energy cost (Ca) + the non aereodynamic energy cost (Cn.a.). Assuming that the concentration of ATP is keeped constant this means that the demand of exercise (equations of the right of the cycle ATP-ADP) have the same value of the offer of exercise (equations at the left side of the cycle ATP-ADP). The value of the last equativo of the offer of exercise is exactely the value of metabolic powe necessary to induce an increas or decrease of the concetration of the molecule we have planned to modify. The metabolic condition induced in the subject performed exercise will be one of the follwing sixst series of well defined described equations in which demand have always the same generalized terms and offer have different equations in relation to the integrative metabolic power of each energetics mechanisms

It is concluded that it is possible to prescribe the correct gamma values of locomotion velocity that surely will induce and increase or decrease concentration of the molecule involved in diseases prevention and therapy.

DEVELOPMENT OF REACTIVITY IN SOCCER GOALKEEPERS

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The aim of this study was to comparison of the reaction speed of soccer goalkeepers during two years. Goalkeeper is unique post in many of sports game. The goalkeeper should have not only the basic characteristics of football players, such as physical fitness or ball control technique, but also ultimate good reaction skills. The reaction is strongly conditioned by good synergies neuromuscular complex, high instability procesess CNS and significantly depends on the sensitivity of receptors (Fozard et al., 1994). Among the important determinants of the reaction time include age, gender, activation, fatigue, distraction, training and stimulants. Goalkeepers need not to be quick in forward moving locomotion, but they have to be able to respond timely, rapidly accelerate, decelerate and change movement directions (Little, Williams, 2005). Therefore, speed training for soccer goalkeepers should not just copy athletes training, but should respect the character of the game. Non-traditional training methods and elements support the player intelligence, development, anticipation and reactivity (Deary et al., 2001).

Fifteen soccer goalkeepers playing Moravian regional league (aged 26 ± 3 years, height 188 ± 8.1 cm, weight 89 ± 9.6 kg) participate in this study. Goalkeepers were randomly selected and had to meet the following standard: actively training with no injuries for at least 6 months before each testing. Simple reaction time tests to visual and acoustic signal and motor reaction time test T 73.0 were used in this study. For simple reaction time tests participant were sitting on the chair with button situated on the table under fingers of dominant upper limb. Objective was to push the button to signal as fast as possible. Visual signal was square showed on computer monitor. Acoustic signal was beep in headset. Both visual and acoustic signals were randomly generated for 20 times with signals period between 1 to 5 seconds. Motor reaction time test T 73.0 is based on catching falling objects which are randomly released 20 times with period 1 to 5 seconds. Tests were used one week before start of summer part of season in two years period.

Results of simple reaction time test to visual stimulus were 176.2 ms (SD = 10.3 ms) in the first testing time and 178.5 ms (SD = 12.1 ms) after two year period. Results of simple reaction time test to acoustic stimulus were 129.9 ms (SD = 13.6 ms) in the first testing time and 132.7 ms (SD = 13.8 ms) after the two year period. Results of motor reaction time test T 73.0 were 158.4 ms (SD = 11.7 ms) in the first testing time and 164.4 ms (SD = 12.6 ms) after the two year period.

These data suggest better reaction time of soccer goalkeepers than normal population in compared with study by Jaworski et al. (2011) which indicate results of men (aged 21-35 years) in simple reaction time to visual signal 255.4 ms (SD = 34.1 ms) and simple reaction time to acoustic signal 210.4 ms (SD = 27.56 ms). Results of the study have shown a slight prolongation of goalkeeper's reaction time in all tests during two years period. This could be affected by aging (Fozard et al., 1994) but we supposed, based on short period between testing and reaction training of participant as part of their training programs that it's caused by actual fatigue. Perceptual and motor skills, including reaction time, stand the longer maintain on a high level, with higher performance and quality sports training. It's necessary to take into account that our results may be affected by small research sample.

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SPORT-SPECIFIC SOURCES OF SELF-EFFICACY OF YOUNG BASKETBALL PLAYERS

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This study is focused on sport-specific sources of self-efficacy in young (15-16 and 17-18 years old) basketball players. Self-efficacy is defined as the belief about one's ability to achieve goals and to overcome obstacles in daily living. Sport self-efficacy, means athlete's belief in ability to per-form his/her sport tasks and specific skills, effects athlete's emotional and behavioral reactions in stressful and anxious situations of the match. Sport-specific sources of self-efficacy can be defined as the sources that athletes use for the judgment of their confidence. Empirical research has shown that in players, high levels of sport-specific self-efficacy are associated with perceived useful ability (Robazza & Bortoli, 2007). This study is relevant because the sport-specific self-efficacy of young basketball players has been not studied in detail. For instance, only adolescent female volleyball players (Magyar & Feltz, 2003) and college-aged basketball players (Demaine & Short, 2007) were examined. The purpose of the present study is to disclose differences in sport-specific self-efficacy between cadets and juniors. The following research question guided this study: what are differences of sport-specific sources of self-efficacy in basketball player's cadets and juniors? The participants were young basketball players of 15 to 18 year old, who participated in the country's championships. The total number of participants was 64 15-16 years old basketball players (cadets) and 58 17-18 years old basketball players (juniors). The Sources of Sport-Confidence Questionnaire (SSCQ), developed by Vealey et al. (1998), was used to measure the athletes' sources of self-efficacy information. The comparison of the variables of 15-16 years old and 17-18 years old basketball players was performed by applying independent samples *t*-test.

Differences in sport-specific self-efficacy were explored between basketball player's cadets and juniors. It was found that for 17-18 years young basketball players were more ($p < 0.05$) important than for 15-16 years young basketball players the following sources: mastery, social support, physical/mental preparation, coach's leadership, and demonstration of ability. No differences existed between basketball player's cadets and juniors in the following sources: physical self-presentation, vicarious experience, environmental comfort, situational favorableness.

These results of the present study confirmed the findings of other studies (Magyar & Feltz, 2003) that have found some differences between athletes of different age groups in sport-specific self-efficacy. However, it seems that the age of players and the nature of sports (basketball) they do are important factors that influence their sources of sport-specific self-efficacy. Wilson and colleagues (2004) demonstrated that for master adult athletes, coaches' leadership was a less important source for their self-efficacy than for young athletes. Adult athletes identify physical/mental preparation as the most important source of sport-specific efficacy. Based on the results of this study and the previous research, it seems that by gaining more experience, the importance of coach leadership may diminish over time. Also, we are sure that further studies are warranted to better understand the differences in multidimensional self-efficacy between basketball players of different age groups.

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FAMILY SPORT IN LATVIA AND POLAND

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Strong dimension of social environment is family; the functioning of it takes place in close connection with changes in society. Main factors, creating for children difficulties in learning and behavior, and later in finding their place in life, is inability to adapt, insecure inner feeling and being afraid from not being accepted.

The number of families, in which parents go in for sports together with children, diminishes. In families word "sport" due to stereotypes, formed in society, is associated with competition one against another, not with competition, in which people compete with them, and their aim is to promote their health. European Sport Charter defines: "Sport denotes all kinds of physical activity, which with unorganized or organized participation promotes the maintenance or improvement of physical and mental health, well-being, the formation of social relations and reaching results in all kinds of competitions."

Aim: Parents' participation in physical activities together with their children.

Research methods: *Empirical research methods*: questionnaire method. The base of the research: families from Rigas regions in Latvia and families from Biala Podlaska in Poland. For data processing were used SPSS18 and Excel.

Results:

The obtained data reveal that parents have positive attitude and understanding about family sport as means in child development, but family sport is not always realized.

Main contradictions:

- Society is being informed about the necessity of physical activities and their importance in health promotion, but surveys indicate that the attendance of physical activities is little, people excuse themselves with busyness.
- Physical activities mostly are connected with physical development, paying less attention to psychical and social development.
- Upbringing environment, which suits children the best, is family. Successful child development takes place, when parents show an example and involve together in physical activities, however more often parents delegate this function to pre-school education establishments, but the task of pre-school pedagogues is to perfect basic skills, acquired in family, and prepare child for learning in primary school, which cannot always be carried out, because pre-school has to perform functions of the family.

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MOTIVATION AND LOYALTY OF THE EMPLOYEES OF SPORTS ORGANIZATIONS

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The purpose of the study is to determine the peculiarities of motivation and loyalty of the employees of sports organizations. Motivation and loyalty are tightly related. Employer must take care of the development and improvement of proper stimulation or so called motivation system. Only then the loyalty will be considered as a natural wish of an employee to stay with the organization, which takes care of him, but not as slavery (Aženeckaitė, 2006). Although any job provides the employee with various types of experiences, for Lithuanians the job is primarily an important source of income and other forms of reward and this trend has become even more apparent recently. At the same time in developed Western countries favourable salary becomes less important and the expression and improvement of an individual becomes more relevant (Pankevičienė, 2004). The issue of employee's motivation and loyalty is important to the managers of sports organizations as only motivated and loyal employee seeks the best results, he/she is dedicated and committed to the organization. **Methods:** analysis of literature, questionnaire survey. The questionnaire was anonymous and formulated referring to other authors (Pankevičienė, 2004; Aženeckaitė, 2006, et al). The research was conducted in October–December, 2010, at four basketball schools in Kaunas and one in Vilnius. 80 questionnaires were hand out, 74 were returned completed.

Results. It was determined that 90.5% the employees of basketball schools consider motivation as a necessary factor. Motivation measures applied at basketball schools are more satisfactory to male employees rather than female ($p < 0.05$). According to employees they would be more motivated to work if they find concrete career perspectives available (28.2%), and if their salary depended on work results and its quality (26.6%). More than half of respondents (62.2%) consider themselves loyal to their organization, however only 10.8% of them were highly satisfied with their salary. Only the fifth part of respondents claimed they get a proper salary for their work and more than half of respondents had trust in their organization (58.1%). We determined that 70.3% of respondents tend to commit to their organization; however, only 46.0% of them would sacrifice their own interests, comfortability, benefit of that moment for the long-term commonwealth of their organization. This may be caused by the factor that employees do not feel appreciated in their own organization; this was confirmed by our research. 27.0% of respondents would like to work in other organization.

Discussion. The researches show (Savareikiene & Daugirdas, 2009) that the most important motivation measures are the primary and additional payments. On the other hand, our research showed that rise in pay in sports organizations is not the main motivational measure. Although employees consider themselves as loyal to organization and tend to commit to it, only less than half of respondents would sacrifice their own interests, comfortability, the benefit of that moment to the long-term commonwealth of their organization. The managers of sports organizations have to put more effort to make the employees satisfied with the work in organization, to make them committed, to make them have trust in organization, and make them want to sacrifice for the organization. Employee's satisfaction is a strong factor influencing commitment and loyalty to organization (Mak & Sockel, 2001).

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HEALTH ASSESSMENT AND SELF- ESTEEM IN STUDENTS' WITH DIFFERENT LEVEL OF PA ACCORDING TO THEIR GENDER AND STATUS OF PE IN THEIR UNIVERSITIES

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The relationship between students' physical activity (PA) and health has been extensively analysed; however, there is a lack of studies which focus on the analysis of PA in students who are enrolled in Universities with PE as a compulsory academic subject in their curricula and in students' who study in Universities with PE as an optional academic subject. The question lies whether there is any difference in students' self-reported health assessment and self-esteem relation to their gender and status of PE (compulsory/optional) in their curricula.

The aim of this study is to analyse students' self-reported health assessment and self-esteem in relation to their gender and status of PE (compulsory/optional) in their curricula.

Objectives:

1. To analyse health assessment self-reported by students with different level of PA in relation to their gender and status of PE (compulsory/optional) in their curricula.
2. To analyse self-assessment made by students with different level of PA in relation to their gender and status of PE (compulsory/optional) in their curricula.
3. To determine the relationship between the self-reported health assessment and self- esteem.

Hypothesis: Self-reported health assessment and self-esteem in students' who are enrolled in Universities where PE is included as a compulsory subject into the curricula is higher than in students from Universities where PE is offered as an alternative.

Research methods: 1. Survey. 2. Statistical analysis.

Students' level of physical activity and their self-reported health assessment were determined using Zaborskis (1997) questionnaire, while their self-esteem was determined using M. Rosenberg (1965) self-esteem scale.

The results of the study were processed with *SPSS 17.0 for Windows* software. Pearson's $\chi 2$ (chi-square) test was used to determine the statistical differences between percentage values of different. Pearson's linear correlation coefficient, *r*, was applied to analyse the correlation between the two indicators.

Participants in the study were 249 students (120 males and 129 females) who were classified into 4 groups according to their level of PA: 1) high performance athletes, i.e. students attending training sessions of a specific sport and taking part in the competitions (n 34), 2) physically active students who exercise at least for 30 minutes 2–3 or 4–6 times a week in their leisure time (the activity accompanied with increased sweating and breathing rate) (n 87), 3) physically inactive students who exercise only once a week, month or even more sparsely (n 95), 4) sedentary students who are not engaged in sport and do not exercise (n 33). 144 students studied in the University where PE was a compulsory academic subject while 105 students studied in the University where PE was offered as an optional academic subject.

Results and Discussion.

Different studies show that students' opinion about their health is positive (Von Ah et al., 2005; Alves & Boog, 2007). The larger part of the subjects in this study reported positively about their health. The statistically significant difference was determined in students' self-reported health assessment between all four groups of students ($\chi 2(12)=45.83$, $p<0.05$).

Students engaged in sports assess their health higher than sedentary students ($p<0.05$), while physically active students assess their health higher than physically inactive students ($p>0.05$). Students studying in the University where PE is not a compulsory academic subject assess their health higher than students studying in the University where PE is an optional academic subject ($p<0.05$). Self-reported health assessment in males was insignificantly higher ($p > 0.05$) than in females.

STUDENTS' OF DIFFERENT PHYSICAL ACTIVITY NEEDS, SELF-CONFIDENCE, VALUES AND APPROACH TOWARDS SPORTS BENEFITS

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Changing society increases the importance of the analysis disclosing students' of different physical activity needs, self- confidence, values and approach towards sports benefits. This would give Ta possibility to make purposeful corrections in the educational program..

The **aim** of the study was to determine students' of different physical activity needs, self-confidence, values and approach towards sports benefits.

The **object** of the study – students' of different physical activity needs, self-confidence, values and approach towards sports benefits

The following **tasks** were raised:

1. To evaluate students' principal values with respect to physical activity and gender.
2. To determine the peculiarities of students' needs with respect to physical activity and gender.
3. To reveal the peculiarities of students' self-confidence with respect to physical activity and gender.
4. To estimate the benefits of exercising with respect to physical activity and gender.

Hypothesis:

Students' (girls' and boys') of different physical activity needs, self-confidence, values and approach towards sports benefits differ.

Results:

The research determined that such values like equality, creativity, meaning of life, commonality with others, freedom, wisdom, spiritual peace, duty, honesty, mature love, true friendship, self-esteem, ambition, loyalty and forgiveness are of greater importance to girls. However, boys put greater importance to influence than girls. It was also revealed that the following values like gratitude, politeness, temperance, neatness are more significant to physically passive students. However, physically active students tend to put more importance to competence, recognition, environment control, harmony with nature, preservation of goodwill, influence and nationalism.

It was revealed that boys care for "being strong" and girls – for "being pretty" and "to love and be loved". Physically active girls appreciate self-realization, revelation of life meaning, and achievement of physical and spiritual harmony more than physically passive girls. However, physically active boys prefer physical and spiritual harmony, on the contrary to physically passive boys, who appreciate good health and relationship with family members.

The study determined that all the subjects are moderately self-confident. Self-confidence between genders does not differ; notwithstanding, physically active students are more confident than physically passive students,

During the investigation it was revealed that boys more often consider exercising to develop self-confidence, increase self-esteem, develop thinking and psychological abilities, teach to discover oneself and develop discipline. Physically active more than physically passive students appreciate the following sports benefits: development of self-confidence, decrease of psychological tension, development of thinking and concentration and contribution to making friends. However, physically passive students appreciate health strengthening and physical development as the benefits of sports.

The hypotheses were confirmed.

THE INFLUENCE OF AEROBIC TRAINING ON THE QUALITY OF LIFE OF ELDERLY PEOPLE

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Introducion: People should engage in physical activity constantly without any longer intervals if they want to experience its true benefits for health and quality of life. Regular engagement in physical activity is often related to good mood, decreasing stress levels and increasing physical capabilities (Rejeski & Mihalko, 2001). Nordic walking is a form of physical activity which is rapidly gaining its popularity and is suitable for people of various ages and health conditions. **The aim of the study** is to determine and asses the influence of Nordic walking on quality of life of elderly people. **The hypothesis of the study is as follows:** presumably, 12 weeks of Nordic walking exercises holds a positive impact on the quality of life of elderly people. In our opinion, engagement in the Nordic walking exercises has a more obvious effect on quality of life of the people who are less physically active than of the people who are more physically active.

Methods: The study included 41 subjects, with an average age of 65±5 years.The participants filled the form of physical activity levels and intensity evaluation suggested by the Health Promotion Research Centre at the University of Washington (Topolski et al., 2006). Objective of the survey is to assess the physical activity of the subjects. Subjects' stature was found with the gauge. The quality of life was established by SF-36 health Survey. The results were analyzed using the statistical package SPSS 17.0 for Windows. The impact of the NW was determined by the analysis of non-parametric criteria. Due to compare dependent samples was used Wilcoxon's test and for an independent - Kolmogorov Smirnov Z test. All results considered as statistically significant if $p < 0.05$.

Results: Our survey results confirmed the positive effects of Nordic walking on quality of life of elderly people. Physically inactive people in everyday life began to provide more satisfaction (57.1 percent of subjects), their health after the workout of Nordic Walking was evaluated as very good (78.6 percent of subjects), or even excellent (21.4 percent of subjects). These data are statistically significantly different also in physically active group. Half of the physically inactive group respondents said their health was much better than the year before. Our research results confirmed the effects of Nordic walking test on emotional state. 54.5 percent of physically active respondents after the workout of Nordic Walking claimed that they are never nervous. 64.3 percent. physically inactive subjects after the workout of Nordic Walking, spoke rarely uncomfortable depleted, 57.1 percent. said that there are happy people. It is confirmed by other researchers conducted studies (Monteiro-Peluso & Guerra, 2005). Biddl'as and colleagues (2000) identifies several reasons why physical activity should be used for improving mental health. Physical activity is cheaper and has fewer side effects than drugs in treating mental health.Studies show that low-and moderate-intensity physical activity has a positive relationship with many areas of quality of life for older people. The biggest changes are that people feel less pain (Stewart et al., 2003). Our research confirmed this provision. 72.7 per cent. physically active subjects of the study said that over the last four weeks of physical pain never prevented, and 71.4 percent. physically inactive groups had argued that physical pain is rarely impeded their social activities.

Conclusions: The Nordic walking exercises had no statistically significant impact on the quality of life of the people who belonged to the physically active group ($p > 0.05$). The quality of life of the people pertaining to the physically inactive group had a statistically significant increase upon taking Nordic walking sessions ($p < 0.05$).

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EFFICIENCY OF THE FRANK-STARLING MECHANISM IN ADAPTING TO HIGH AND EXCESSIVELY HIGH PHYSICAL WORKLOADS

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Efficiency of the Frank-Starling Mechanism in adapting to different physical workloads has been insufficiently studied. In this paper we report the results of experimental studies at high and excessively high physical workloads. Studies were carried out on male Wistar rats with a body weight of 200 to 300 g. Swimming with extra load with a water temperature of +30-32°C 5-6 times a week for an hour during 12-13 weeks was considered as high workload. Weight of the extra load had been gradually increased up to 7.5-10% of body weight by 10^{th} week. Thereafter swimming duration with the same extra load was increased for some animals up to 4-5 hours a day in two following weeks. These workloads led to a sharp decline in performance and were considered as excessively high ones.

Efficiency of the Frank-Starling mechanism was evaluated by spontaneous contractile right atrial preparations. Having been immersed into oxygenated Krebs-Henseleit solution they were gradually extended to a length at which they developed the maximum tension. Tension was recorded by the *F-50* myograph of the DMP-4B Physiograph with a temperature of +34°C.

Results of research showed that maximum atrial tension of animals adapted to high workloads was 26% higher during extension than of the controlled ones ($p<0.02$). There's no difference in results under conditions of excessively high workloads, but tension is 35% lower than under conditions of high workloads ($p<0.01$). Preparations length – tension relation graph ($\Delta T/\Delta L$) with extensive workload of more than 4 mH under conditions of high workloads is also higher than under excessively high workloads ($p<0.05$-0.01). The latter ones were characterized not only by the relatively low plateau $\Delta T/\Delta L$, but also by its earlier achievement – under workload of 3 mH and with atrial length increasing by 4.4 mm only. These parameters are much higher for controlled animals and under conditions of high workloads – 5 mH and 5.9±0.2 mm ($p<0.001$); 6.6±0.2 mm ($p<0.001$) respectively.

Consequently excessively high physical workloads substantially reduce efficiency of the Frank-Starling mechanism. This is reflected in the fact that this mechanism is mobilized after a relatively low myocardial extension, and tension does not increase during further extension. Under conditions of high workloads, by contrast, the Frank-Starling mechanism achieves high efficiency only with high extensive workload. In the whole organism, this would mean mobilization of the mechanism after large heart cavities filling during diastole, which is typical for the trained organism experiencing muscular work.

THE EFFECT OF LOCAL VIBRATION ON ANAEROBIC CAPACITY OF ROWERS

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Whole body vibration is a worldwide innovation as a part of training method that helps athletes to regain the power and get ready for next training faster. However less attention is paid to local vibration where an isolated muscle or muscle group is stimulated by the use of a vibration device. In sports the mechanical vibration device is used both as a massage device and as a training method. Scientists have discovered that there are two different kind of effects of vibrations in sports: the first is immediate and short term effect, but the second is long term effect and it is called the vibration training, that is performed under the same conditions as conventional methods of training (Issurin V.B. 1999., Bosco C. 1999., Cardinale M. 2003., Cohrane D.J. 2010.).

Aim of the research: The effect of local vibration on the anaerobic capacity of rowers.

Methods: Study and analysis of scientific publications, pedagogical experiment, test, electromyography (EMG), goniometry and mathematical statistics methods.

For the reason to determine the effect of local vibration on anaerobic capacity of rowers, two research groups were assembled from the students of Murjāņi Sport Gymnasium (MSG) during the period of time from November 13, 2010 to March 20, 2011 - the experimental group (EG) and control group (CG). We chose the students of MSG because they all have equal training systems and all the students have similar daily regimen. There were 15 students in the experimental group and 12 students in the control group, aged from 18 to 24 years, with different experience in rowing. The pedagogical experiment can be divided in three stages: Stage 1. The first test using the stationary Concept-II ergometer was performed; also the EMG was determined, that took place from November 13, 2010 to November 30, 2010. Stage 2. Whole body local vibration sessions for the participants of experimental group. Sessions of local vibrations were performed with Vibromassager WM-1, S/N09/01, with the power of 220 V, with frequency 100 Hz, 500 W, Type B. 3. Stage 3. Tests with stationary Concept-II ergometer, EMG and goniometry after the sessions of local vibrations form March 8, 2011 to March 11, 2011.

Results: The results of anaerobic capacity tests after 12 weeks of local vibration sessions for the rowers of experimental and control group were compared to the results of first test. The average increase of the results of the second tests in comparing to the first test is 221,1W. The best results in the experimental group for the first test was 826W for the participant E-1 and 821W for the participant E-2, but the weakest result was 474W for he participant E-15. The best results for the second test for the experimental group was 1058W for the rower E-3 and 1055W for the rower E-1, however the weakest result 478W was for rower E-15 but rower E-2 didn't participate in the second test. Participants of control group accomplished the second test with average increase in the group of 36W. The best result in control group was 755W for participant C-3 and the weakest result was 470W for participant C-11. The best result for the second test for the control group was 821W for rower C-3 and the weakest result was 478W for rower C-12. Data were processed with SPSS 17 program to determine the credibility of difference of T-

test. In the first test the T-test p-value was 0.802 < 0.5. But after the second test the T-test p-value was 0.003 < 0.05. After the EMG was determined for the experimental group, we can see that the Triceps Brachii muscle biopotential has considerably increased both on right and on the left side (before the beginning of the movement and during the movement). However Latisimus Dorsi muscle biopotential haven't changed considerably neither on right nor on the left side (before the beginning of the movement and during the movement). Yet for the control group muscle biopotential hasn't changed considerably. In the most cases the p-value of muscle frequency and biopotential was < 0.05, which means the differences are considerable, but for the control group the differences have been observed only in few cases.

Conclusions and discussion: Many scientists in their researches have used different vibration frequencies, amplitude and time of vibration to determine the immediate and short term effect. The scientist opinions on vibration frequency range vary starting from 5Hz to 300Hz and more. But the amplitude is from 1mm to 10mm and more, as well as the time of vibration varies from 5 seconds to even 30 minutes. In the same way the number of repetitions varies from one single repetition to several months. For the purposes of the study of rowers the vibration device was set on 100Hz frequency, 2 - 4mm amplitude and the variable vibration time added in each session was 5 to 20 minutes for the total of 12 weeks with 2 to 3 vibration sessions per week. After the local vibration sessions for experimental group, the anaerobic test results prove considerable increase on the stationary rowing ergometer Concept - II. As for the control group, there were no considerable increases observed. EMG proves considerable Triceps Brachii muscle activity improvement for the experimental group, yet the activity improvement was not observed for the control group. Latisimus Dorsi muscle activity was uniform in both tests for both groups.

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DYNAMIC OF MUSCLE ELECTRIC POTENTIAL IN EXPOSURE OF LOCAL VIBROSTIMULATION

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Local vibration has been researched in Latvian Academy of Sport Education widely. In previous researches we clarified effect of local vibrostimulation on development of strength abilities, such as maximal strength, strengh endurance, power. Also local vibriostimulation was applied in high performance sport, such as bobsleigh. The major advantage of local vibration application, compared to whole body vibration, is, that there is no need to vibrate whole body, single muscle of muscle group can be included in local vibrostimulation session. Therefore it is possible to choose most loaded and responsible muscle group in specificē kind of sport, that allows to decrease time for vibration session and also decreases possibility of accurance of negative effects of vibration, such as vibratory disease.

There is previous reseraches, that whole body vibration affects muscle electric potential, and therefore more objective conclusions can be made, based on dynamics of muscle electric potential. So we need to clarify, the influence of the local vibration on dynamics of muscle electric potential.

Experiment was organised in LASE Scientific laboratory. The electromyogramm was registered before application of the local vibrostimulation, during and after load of local vibrostimulation, using the electromyograph with skin electrodes of REV9000 complex. We used electromyograph to record the peripheral nerve electrical potential fluctuations electromyogramm (EMG) of quadriceps muscle, performing seated leg extension in concentric regimen, thus defining the effect of local vibrostimulation on the muscle nervous system. In the experiment participated 11 male subjects, 23±1.6 years old, with previous experience in sports training not less than two years. Vibrostimulation was implemented on the quadriceps femoris muscle, going from distal to proximal parts. We used test protocol with 6 sets by 10 repetitions in each, with EMG registration. Local vibrostimlation was applied immediately after 1st set with parallel EMG recording.

Electric potential significaly increased during vibrostimulation, and it remained increased after vibriostimulation also.

Table 5.

Effect of local vibrostimulation on electric potential parameters of muscle in mV (x_{ave}±$s_{\bar{x}}$) (n=11)

	1. set	Vibrostimulation	2. set	3. set	4. set	5. set	6. set
mV max	0,34±0,02	1,69±0,04	0,95±0,05	0,78±0,05	0,88±0,04	0,87±0,08	0,73±0,09
Average mV	0,30±0,02	1,25±0,06	0,63±0,04	0,46±0,07	0,52±0,09	0,46±0,05	0,45±0,02

Analyzing the results, we conclude that the maximum electric potential (mV max) during vibrostimulation was higher than before vibrostimulation (increase significant, $p<0.05$), the same was also reflected in the indicator of average electric potential (increase significant, $p<0.05$). We also observed that during vibrostimulation the electric potential is highest, indicating to direct effect of vibrostimulation on the peripheral nervous system.

The fluctuation curve of average electric potential is much like the curve of maximal electric potential; in particular, this is visible evidence that the local vibrostimulation indirectly creates much higher voltage impulses than the application of maximum load.

DURATION OF LOCAL VIBROSTIMULATION EFFECT

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Local vibrostimulation is a form of vibration, which is performed with gentle vibrotode slide perpendicular to the muscle surface, and only the target location is affected, without involving other muscles, joints, without prejudice to the internal organs, which are not expected to be affected in session of local vibrostimulation. So the local vibrostimulation provides more effective share of session time and resources, as it is possible with devices of whole body vibration. So the local vibrostimulation is the base of our research, however, it is not possible to perform vibrotraining, using a local vibration equipment. The problem is – the tonic effect of local vibrostimulation do not appear instantly, but after some time (5-15min., depends of athletes training experience), but it is still not clear, when effect disappear.

Therefore the experiment was held in Latvian Academy of Sport education, and aim was to determine duration of local vibrostimulation effect on the quadriceps femoris muscle.

To carry out the experiment, we tested seated leg extension movement in concentric regimen (with passive extension). In research we used the detection apparatus of functional state diagnostics - dynamometer REV9000. The torque (Nm) test was held in the laboratory of LASE Heavy athletics department using the isokinetic dynamometer REV9000. Local vibrostimulation was applied to the quadriceps muscle, going from distal to proximal part. Test protocol consisted of 6 sets with 10 repetitions of concentric leg extension in knee joint with limited angular speed – 250°/s; local vibrostimulation was applied after first set. Rest between sets was 5min, so the experiment for one person took approximately 42min; 11 subjects were involved in experiment. Parameters of local vibrostimulation: 2mm amplitude and 90Hz frequency.

Data analysis after experiment showed, that torque significantly increases in 2nd set, after application of vibrostimulation (by 36.3Nm, $p<0.05$), highest torque was reached in 3rd set (247.1±4.7, $p<0.05$) and torque remained significantly higher through the remaining 3 sets.

Table 1

Effect of local vibrostimulation on dynamics of torque, Nm (x_{ave}±$s_{\bar{x}}$), n=11

Torque /set	1. set	Vibro stimulation	2. set	3. set	4. set	5. set	6. set
Nm	206,9±5,7		243,1±6,6	247,1±4,7	246,4±3,8	238,7±7,4	256,7±5,9

Results of experiment allows to conclude, that effect of local vibrostimulation does not reach highest point immediately after application of local vibrostimulation, but after 5-15minutes, in our case, in 3rd set of test and remained significantly increased during rest of experiment (approx. 30 min.). So we can recommend using the local vibrostimulation on single muscle or muscle group, specific in defined kind of sport, to tone for competition or between competition rounds, periods, sets etc. The acute effect on affected muscle will remain for 30 minutes.

GRASSROOT SPORT FUNDING MODELS IN EU: NATIONAL IMPLICATIONS

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Introduction. One of the biggest challenges to the future development of the sport sector is financial stability. Grassroots sport relies on a variety of funding sources. The recent economic and financial crisis make impact on the current and future trends in financial resource management of the clubs (Andreff, 2010). European Commission policy on sport stated in „White Paper on Sport“ (2007) and later in „Communication on sport“ (2011) refers the importance of sustainable financial policy of the grassroot sport. The purpose of this study is to introduce with funding models for grassroots sport across the EU and reveal main funding peculiarities of the selected Lithuanian sports in comparion with other countries.

Methods. Structure of the interview and desing of the questionnaire were prepared and approved by four consortium partners of EU project „Study on the funding of grassroot sports in the EU“ (2012). The interviews were taken from the representatives of five Lithuanian sports federations: basketball, football, gymnastics, tennis, track-and-field athletics. An in-depth survey of 36 grassroots sport clubs in mentioned sports was made on the basis of criteria to ensure that the bottom-up analysis covered a large diversity of situations. Research was completed in August, 2010. Final report was publicly presented in February, 2012.

Results. There are four funding models, along with two special cases across the EU. They mainly differ in terms of the relative importance of private and public funding sources, of the relative contribution of voluntary work and of the level of revenue per capita allocated to grassroots sport. In Lithuania public expenditures on sport are not very high, but remain a major source of revenue for the sport organisations. The rate of effort of households is variable, participation and membership rates are comparatively low and voluntary work is not very important. In Lithuania, more than 80% of the respondents have less than 100 members. Study reveals that organized sport club culture often is missing in Lithuania. There is a lack of traditional sport club organisation and management structure that‘s direcly or indirectly referes to the funding shemes of the clubs. Also exists a confusion between the notions of “club” and “team”. The variety of participation rate, structure in membership, etc. imply the key revenue sources, including solidarity mechanisms and the main sourses of expenditures.

Discussion. Grassroots sport carries its general public interest mission and at the time responds to economic forces like demographic trends, changes in the business cycle, in the competitive environment as well as regulatory framework. It is clear that public expenditure growth is constrained by the fragile state of public finances. Household expenditures on sport are also threatened by the expected slow growth. Companies, current and potencial sponsors, are reconsidering their investment priorities and sport often becomes only an additional activity.

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BODY WEIGHT REDUCTION IN SPORTS WITH WEIGHT CATEGORIES

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In sports with weight categories, it became customary to reduce weight of athletes just before the tournament. Horswill (2009) found that 70-80% of judoists reduce their weight for inclusion in the lower weight category. It is done by significant restriction of fluid intake, exercises for dehydration and sweating. This body weight reduction has serious consequences. The aim of this study was to observe the ways of weight loss in martial arts with weight categories.

The study included 21 men and 13 women from judo, wrestling Greco-Roman and freestyle, MMA (Mixed Martial Arts), kickboxing, karate and Thai box. We chose a questionnaire with closed and open questions. We used descriptive statistics parameters (arithmetic mean, standard deviation, percentage terms).

Table 1:

Basic characteristics of the research file. Values are reported as mean ± SD.

	n	Age (years)	Sport practice (years)	Weight (kg)	Trainings per week	Competitions per year
Men	21	23,19 ± 2,61	13,30 ± 4,21	78,10 ± 8,00	6,58 ± 2,45	10,53 ± 4,65
Women	13	23,07 ± 3,38	15,41 ± 4,23	62,46 ± 6,48	5,29 ± 3,51	8,00 ± 5,36

Our results show that 88.2% of respondents (n=34) regularly reduce their body weight before competition. This reduction is on average 4.0 kg (minimum 1 kg, maximum 10 kg). The average number of reduction per year was 6.4 reductions per person. We also asked respondents for their maximum reduction of body weight, and the answers were on average 6.5 kg (range from 0 kg to 13 kg). Further we investigated how many kilograms would respondents be willing to reduce before important competition. It was on average 6.6 kg (range from 2 to 13 kg).

We also wanted to know how many days the athletes need for weight decreasing. Average length of reduction was 5.5 days. On the question if the importance of competition affects the tactic of weight reduction 73.5% of respondents said they do not. 61.8% of respondents said that they don't maintain weight, if they have several tournaments in a row and 88.2% of respondents said that they continuously monitored their weight.

Majority of respondents answered that they feel during reduction bad mood (70.6%), fatigue (53.0%), lack of physical activity (26.5%) and insomnia (17.6%). An important part of the survey was to find the way of weight loss. As we expected, the majority of respondents reduce their weight by restriction of food intake (84.8%), restrictions of fluid intake (84,8%), changes in diet (84.8%), dressing up more layers of clothing for training (81.8%) and increment of physical activity (63.6%). 45,5% of respondents use a sauna, 45.5% of them use nutritional supplements.

Our results show that losing weight before tournament is common in sports with weight categories. Mostly it is a rapid weight loss primarily through dehydration. Our results also confirmed a number of other studies. Kurakake et al. (1998) in their study show the daily caloric intake of Japanese judoists (n = 22). It was 2024 calories 7 weeks before the competition, while 1 week before the competition caloric intake was 1355 kcal. The same author also showed a moderate increase in carbohydrate intake and decrease fats and proteins in the eight reduction diet. Other studies have reported an increase of fatigue, stress and anger after the body weight loss (Hall & Lane, 2001).

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MUSCLE FUNCTIONAL STATE CHARACTERISTICS OF LATVIAN WEIGHTLIFTERS

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In weightlifting as a kind of sport important not only absolute strength, but the distribution of strength in period of time. Often coaches only visually evaluates test results and morphologic indicators. However, to predict the potential ability the weightlifters, it is desirable to follow the complex methodology for assessing the weightlifters in specific exercise of weightlifting competition. Our study aim is to explore the Latvian weightlifters muscle functional state in the competition condition.

Tests were conducted on a dynamometer system REV9000, using leg flexion and extension in knee joint, resulting in obtained torque characteristics, which were used to describe muscle functional state. Testing protocol consisted of five minute tension of thigh muscle, an eight minute warm-up with the free movements, and a special three minute warm-up on the isokinetic system REV9000. Testing in isometric conditions followed, with three repetitions by five seconds in each repetition.

The study results show that the muscle relaxation time (t_{relax}=0.43±0.02 s) of Latvian weightlifters significantly differs. This points to the variable nature of this problem and the fact, that weightlifters training program must include methods for muscle relaxation improvement. The level of contraction and relaxation process does not allow the Latvian weightlifters to recruit a significant amount of motor units at the same time, so as quickly relax them.

Table 1

Functional state of muscle of Latvian weightlifters (n=16)

Coefficient	EC	F_rC	RC	∑C
x±σ	3.14±0.5	4.60±0.37	3.08±0.01	10.82±0.29

EC - coefficient of explosive force
F_rC – coefficient of relative force
RC – coefficient of relaxation
∑C – coefficient of muscle functional state

Comparision of muscle contraction and relaxation processes of Latvian weightlifters allows us to determine functional state of muscle: the best functional state indicators ΣC = 9.66±0.41 and the lowest ΣC = 6.42±0.22.

With comparison of weightlifters muscle contraction and relaxation processes in competition conditions, obtained graphical curves made it possible to distinguish five muscle contracting and relaxing interaction patterns: athletes contracting muscles very quickly with very fast relaxation, athletes quickly contracts the muscles and relaxes quickly, athletes contarcting muscles fast with slow relaxation; athletes slowly contracts the muscles and relaxes quickly; slow contraction and slow relaxation of athletes muscles.

Latvian weight lifters during training attention should pay attention to the improvement of muscle contraction and relaxation processes by selecting the appropriate training means for muscle functional state development.

RESEARCH OF FUNCTIONAL COMPETENCES AND PHYSICAL ABILITIES IN LATVIAN ACADEMY OF SPORT EDUCATION

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The introduction of means of instrumental measurements of athletes quantitative and qualitative indicators, as well as methods of reproduction of movements on the training machines, prepares the future positions of qualitative transformations of athletes training processes.

There is no need to prove that the training of athletes is becoming more visible features of a managed process, in which the achievement of the objectives is realized through constant comparison of planned and existing availability of indicators, which enables the evaluation and selection of tools, used to reach the target. The very way of achieving the ultimate objective of the controlled process of preparing high performance athlete contains a large number of intermediate stages. Use of current methodology underlying the preparation of athletes, bear the imprint of one of the major contradictions of sports perfection, is the need to build motor skills, not allowing basic stabilization in the intermediate stages. We affect stabilization and development of motor skills by various instrumental methods and scientific directions, available in Functional Competences and Physical Abilities Research laboratory (FCPARL).

The **aim** of laboratory activities is the research in certain scientific directions to connect the scientific breakthroughs and practical recomandations for coaches and athletes.

One of the FCPARL main directions is individualization of overall, special endurance in heavy athletics. So, one of the most topical problems in contemporary kettlebell lifting training process is the forearm and hand muscle workout. Performing the competition movement continuously, forearm muscles are those, which first show signs of fatigue, and to a great extent influence ceasing of the exercise. We applied analysis of expiratory gas analysis system to work out recommendations for the individualization of kettlebell lifter workout process, which led to high competition results in kettlebell sport. Specialists of FCPARL also analysed joint speed (with SIMI Motion capture system) in martial arts, such as taekwon-do, and clarified fact, that greater speed of the leg kick can be achieved with the greater kicking distance, also the results of the study had shown that the kicking speed depends on biomechanical structure of the movement and anthropometric features of the athletes. Therefore determination of optimal biomechanical structure of the kicks with regard to individual particularities of the athletes promotes more effective planning and implementation of the training process.

Other branch of FCPARL activities lies on research of tonic and relaxing effect of local vibrostimulation, mainly acute; and duration of this effect. In various researches was applied such **methods** as dynamometry and electromyography with REV9000, myometry with MYOTON 3.

Experiments showed that tonic effect of local vibrostimulation does not occur immediately after procedure, but after 5 to 15 minutes and remains for 40 minutes or more. Immediately after procedure sportsmen feel relaxed, and testing of strength abilities also showed, that strength indicator are lower immediately after procedure, so as it is claimed by conclusions of other researchers (Issurin, 2005; Mester, Yue and Kleinoder, 2004).

We also determined, that variating with main parameters of local vibration (frequency and amplitude), there is possible to achieve tonic or relaxing effect. Our team is working on recommendations for coaches and athletes to use portable equipment of local vibrostimulation in training process, but we still need to clarify following questions: how the change of local vibrostimulation parameters affect muscle; the monitoring of resonating waves, caused by vibrostimulator and providing effect of local vibrostimulation deep in muscle near the bones, so this location is hard to influence with classic massage; and physiological base of local vibrostimulation.

Citing these simplified examples of some information about the research branches of FCPARL, we want to emphasize that the current practice of athletes training can only smooth out the contradictions by variations in the selection and use of training and control means.

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INFLUENCE OF MATERNITY PERIOD TO HIGH-PERFORMANCE MODERN PENTATHLETE'S PHYSICAL PREPAREDNESS AND FUNCTIONAL CAPACITY

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Many physiological and hormonal changes occuring sportwomen during pregnancy, delivery and postpartum period (Pivarnik, 2006). Regular program of recreational exercise during pregnancy is safe and beneficial for healthy women and their offspring, and continuing regular exercise after pregnancy is recommended too (Clapp, 2005). Kardel (2004) research results show that well-trained women can benefit substantially from training at high volumes during an uncomplicated pregnancy. This can facilitate a rapid return to competitive athletics.

The aim: to analyze the influence of maternity period to high-performance modern pentathlete's physical preparedness and functional capacity.

Methods. During the year 2006-2011 the researches of modern pentathlete, a member of Lithuanian Olympic team were carried out in LEU Sport science institute. Year 2009-2010 was the period of athlete pregnancy, giving birth and postnatal period and after that she came back to active sport. A survey about sportswoman physical activity during pregnancy and postnatal period was done. Some indices of physical preparedness and functional capacity were determined. (Skernevičius ir kt., 2004).

Results. Period of pregnancy and giving the birth were without complications. During the pregnancy sportswomen was physically active and a period of hypodinamy lasted for 6 months. Sportswoman muscle mass, vital lung capacity decreased slightly, fat mass hasn't changed and was very small (4 kg). More changes were in hand force: the force of right arm decreased by 8 kg, left – 4 kg. Single muscle contraction power had a tendency to decrease after returning to active sport, anaerobic alactic muscular power hasn't changed. More significant changes were in cardiovascular system. Heart rate at rest was higher by 8 b/min, recovery after physical load was slower. Index Roufier shows large capacity of cardiovascular system. Before pregnancy it equalled -1,2 and after – 0,8. **Discussion:** After a period of maternity and 4 months training cycle physical and functional abilities of this penthathlete became close to the levels prior to motherhood. After 10 months of preoperational period pentathlete won third place in world cup.

Key words: modern pentathlon, motherhood, physical preparedness, functional capacity.

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SECURITY PERSONNEL PSYCHOMOTOR COMPETENCIES INFLUENCE DETERMINATION, USING MULTIPLE CRITERIA EVALUATION METHOD

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Introduction. Competence is often described as the broad range of knowledge, skills, attitudes, and observable behaviour that together account for the ability to deliver a specified professional service. Haag *et al.* (2000) extended the concept of competence to include the concept of psychomotor competences of human, thus, it represents a set of specific physical and mental abilities, qualities or skills accounting for smooth human effectiveness in carrying out definite professional or situational tasks. Van Iddekinge *et al.* (2011) reconsidered some widely held beliefs concerning the (low) validity of interests for predicting criteria important to personnel selection, and reviewed theory and empirical evidence that challenge such beliefs. The evaluation of professional competences possessed by security personnel, the selection and rating of security workers is an important problem encountered by the representatives of many fields of science.

Methods. 22 leader managers (experts) of „G4S Lietuva“ Company with not less than 10 years of service at private security structures involving the execution and organization of security have rated the competences chosen by us: Theoretical and practical training (x_1); Professional activity (x_2); Mental qualities (x_3); Physical development (x_4); Motor skills (x_5); Fighting skills (x_6). Expert judgement method was applied to determine criteria weights. This expert judgement method was implemented at the following stages (Turskis *et al.* 2006).

Discussion. Having determined the weights of criteria by expert methods, we learn how much one of the criteria is more significant than another one. It is obvious, that criteria according to the significance of criteria rank is as follows: $w_1 \succ w_3 \succ w_5 \succ w_6 \succ w_4 \succ w_2$ **(Fig. 1)**.

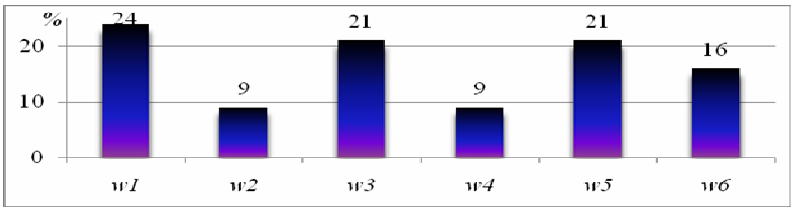

Fig. 1. Criteria weights of elite security workers

It is obvious that 3 criteria are very important, 2 criteria are of medium importance and one criterion is important. Lithuanian security staff examinations of professional competence are small examined area. S. Dadelo (2005) examinations using internal and external factor analysis methods had differentiated our most important competencies. We found the percentage of the weight of the investigated factors. Investigation showed security guard the importance of psychomotor competencies of professional performance. Estimating personnel performance is a complex problem. The method described in this article can be used as a basis for further development. A simple set of five criteria describing basic skills of elite security workers was used. Workers' performance must be described by many criteria. Criteria weights and sets can vary according to different situations and character of research. Additional criteria and different sets can be applied for this universal method.

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SEX AND FEMALE HORMONES EFFECT ON VISUAL MEMORY

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Introduction. The receptors of females sex hormones estrogen and progesterone are found in brain cortex, hypothalamus and limbic areas, and is known their influence on cognitive functions (Wolkowitz, Rothschild, 2003). Sherwin (2003) have studed attention, visual memory, found that these characteristics get better in luteal phase, when progesterone concentration in blood is higher. Brain hemispheres represent a division of labor, with the left hemisphere largely resposible for male-dominance functions, while the right brain is responsible for more female-dominance tasks (Hausmann, Güntürkün, 2000). The foundation for these dimorphic difference appears to be a cerebral asymmetry associated with estrogen (Hausmann, Güntürkün, 2000). Interestingly, a study of the changes in processing over the menstrual cycle has done much to change that view.

The aim of the study was to establish sex and female hormones effect on visual memory.

Methods. Subjects — healthy and physically active women (n = 15), whose was named as control group, female basketball players (n = 15) and healthy, physically active males (n = 15). The age of subjects was 19—23 years. All females participants did not use oral contraceptives during 6 months and had regular menstrual cycles. At the begining of every experiment the sample of 5 ml venum blood was taken to establish the menstrual cycle phases: the follicular phase, ovulation and luteal phase. In our study we measured estradiol and progesterone concentration in blood on the second day of the menstrual cycle (follicular phase), on the fourteenth (ovulation) and on the twentythird day of the menstrual cycle luteal phase. Also, to estimate the duration of the menstrual cyle and the ovulation day, every morning each participant measured the rectal temperature for 3 months before the experiment. Cognitive functions tests were made using Effecton Studio 2006 programme (Effecton Inc., Russia). The visual memory function was estimated by using double-digit number recognition and figure recognition memory tests. The time (s) of task performance and amount of double-digit number and figure recognition were estimated. One week before the experiment the participants were instructed to perform the visual memomory tests.

Results. The statistical significants were found comparing double-digit number recognition results with control group in ovulation and luteal phase with females basketball players ($p < 0,05$), females basketball players made task faster compare with control group during menstrual phases. The statistical significants were found comparing double-digit number recognition time results with control group in follicular and luteal phase with females basketball players ovulation and luteal phase ($p < 0,05$). The statistical significants were found comparing double-digit number recognition time results with males and control group during menstrual cycle ($p < 0,05$).

Conclusions. The visual memory to visual stimulus was better in males group as also in female basketball players compared with physical active females during menstrual cycle. The visual memory was better in folliculare and luteal phases, but the difference wasn‘t significant meaningful.

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THE INFLUENCE OF VISUAL FEEDBACK ON ISOMETRIC CONTRACTION OF LIMB MUSCLES AFTER ISCHEMIC STROKE

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The stroke is second leading cause of death in the world (Mousavi et al, 2011). The muscle strength, balance, cognitive functions are impaired after stroke. It affects negatively activity of daily living (Kwakkel et al, 2011). Visual feedback has the significant influence on recovery of the motor function after stroke (Cirstea et al, 2006; Ramachandran & Altschuler, 2009).

The aim of the study was to establish the influence of visual feedback on isometric contraction (20% of maximum voluntary contraction (MVC) of limb muscles after ischemic stroke (IS).

Right-handed healthy subjects (n=20, age – 66.05±6.2 years) and subjects after stroke (n=20, age – 68.6±6.4 years) participated in the study.

The process of the study was introduced to subjects. They were instructed to perform the task. MVC was measured using isokinetic dynamometer „Biodex System Pro 3“ and 20% of every subject MVC was established. Each subject performed 2 isometric muscle contractions (IMC) with each limb at 10 sec. intervals. IMC were performed with and without visual feedback. The absolute errors were calculated on purpose to establish the accuracy of IMC.

The results of the study showed that absolute errors of IMC of both arms tended to be higher when men and women performed the tasks without visual feedback. Women after stroke made higher absolute errors with both arms compare to healthy women (right arm - $p<0.05$; left arm - $p<0.01$). The absolute errors of IMC were higher when the task was performed by women after stroke with visual feedback also ($p<0.01$).

Absolute errors of IMC of both legs tended to be higher when men and women after stroke performed the tasks with and without visual feedback.

Therefore it could be maintained that visual feedback enables healthy persons and persons after stroke to perform IMC more accurately. The absolute errors of IMC of subjects after stroke are higher without visual feedback. The absolute errors made by women are smaller compare to men.

***Keywords*:** isometric contraction, visual feedback, ischemic stroke

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DOES FORCE DEPRESSION DEPEND ON SPEED OF SHORTENING IN FRESH AND FATIGUED QUADRICEPS FEMORIS MUSCLE?

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Steady-state isometric force following active muscle shortening is lower than the force developed during a purely isometric contraction at the same muscle length (De Ruiter et al., 1998; Kosterina et all., 2008). This phenomenon is referred as force depression (FD), following muscle shortening (Herzog & Leonard, 1997). Studies with humans (Lee & Herzog, 2003) and animals have shown that FD increases with increasing amplitudes of muscle shortening (De Ruiter et al., 1998), and decreasing speeds of muscle shortening (De Ruiter et al., 1998). It was shown that FD is present during submaximal extension flexion movements as well as maximal voluntary contractions (Lee & Herzog, 2003) in humans. From these results, the authors concluded that FD occurs in normal daily movements. Masiulis et all., (2009) has shown that in electrically activated human quadriceps muscle shortening induced FD is an important phenomenon, which is of similar magnitude in fatigued and unfatigued muscle. However, there are no data to show whether FD following muscle shortening depends on speed of shortening in fresh and fatigued muscle. The aim of this study was to analyze and quantify the effects of shortening speed in fresh and fatigued muscle.

Healthy untrained men (n=9) performed isometric reference contractions and isometric–concentric–isometric contractions using 50 Hz maximal electrical stimulation at 30°/s and 60°/s speeds of muscle shortening. FD was assessed by comparing the steady-state isometric torque produced following active muscle shortening with the purely isometric reference torque obtained at the corresponding muscle length. In order to evoke fatigue stretch-shortening cycle exercise (SSC) which consisted of 50 drop-jumps were performed from 0.4 m box with counter-movement to 90° in the knee with immediate maximal rebound. The rest interval between the jumps was 30 s. Additionally, muscle soreness as well as creatine kinase activity before and at 5 min, 1h, 24 h, 48 h and 72 h after SSC exercise were calculated. Work performed by the muscle (WD) was calculated as the area under the muscle force-length change graph.

Shortening of the quadriceps muscle at 30°/s (FD30) and 60°/s (FD60) produced FD consistently for all nine subjects in fresh and fatigued muscle. The relationship between FD and the WD for 30°/s and 60°/s of muscle shortening was similar (r^2=0.94 and r^2=0.89, respectively). The mean values of FD30 and FD60 reduced significant different after 1 h following SSC exercise. However, WD depends on speed of muscle shortening in both fresh and fatigued muscle. From the results of this study we conclude that FD depends from WD, but does not depends from the speed of muscle shortening in both fresh and fatigued quadriceps femoris muscle.

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SHOOTERS' PRE-START PSYCHOLOGICAL CONDITIONS AND METHODS OF THEIR SELF-REGULATION

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High sports achievements are associated with athlete's ability to psychologically prepare for showing one's highest result directly in competition. One's readiness and skill level of sports activities each athlete demonstrates in competition where one of emotionally hardest moments is the start of the beginning of competition day (Ābele, 2009). Psychological preparedness plays a particularly important role in shooting sport. Pre-start excitement and stress during the competition affect shooters much more than any other sports representatives. Most of the technical errors are made due to insufficient psychological training. Even very experienced shooters' results of competition are subject to emotional condition impact. However, high class shooters stand out with their ability to the control this situation and show the best shot directly in competitions (Юрьев, 1973, Жилина, 1986). Optimization of psycho-emotional position can be performed by a coach or psychologist (hetero-regulation) as well as the athlete oneself, if he or she has acquired appropriate skills and competences (self-regulation) (Ābele, 2009).

The aim of the study is to assess the Latvian sport shooters' readiness for competitions – to analyze the pre-start psychological conditions and the shooters' self-regulation skills. As methods of study were used literature analysis and surveys which involved 32 high-class athletes from Latvia. In the first study of this kind shooters gave his self-assessment of their psychological preparedness. The questionnaire included 13 questions about shooters' pre-start conditions, ways of excitement, ability to overcome anxiety and psychologically to tune in both the exercises and performing a single shot.

One of the most effective methods of helping people control their stress and anxiety is to assist them in developing their confidence. Highly confident people who believe in their abilities experience less state anxiety (Weinberg, Gould, 2005). The results of the study show that shooters' psychological preparation in Latvia is insufficient. Most shooters - 75% – feel anxiety before competition, 19% of shooters do not feel anxiety, but 6% of athletes are difficult to answer this question. 63% of shooters feel anxious during the competition, 28% of shooters do not feel anxious, but 9% of shooters are difficult to answer this question. Most characteristic of pre-start conditions for shooters is pre-start fever – in 55% cases. In 67% of cases it becomes apparent directly before the start. For 88% of shooters the excitement when shooting in the final is bigger than it is during the performance of qualifications exercise. Each shooter regulates one's psychological condition in a different way, but they all lack the knowledge of self-regulation methods as only some of the athletes have been informed by the coach or they have read specialized literature. A survey of shooters showed that 53% of shooters know nothing of such methods. 20% of shooters do not use any methods for tuning in before competition, 14% do not use any methods to tune in before a single shot. The shooters, who get disposed psychologically, mostly use similar or uniform methods like concentration on the technical execution of a shot, concentration on a certain part of body as well as breathing exercises.

Conclusions: it is necessary to elaborate an appropriate pattern of psychological training for Latvian shooters. For this pattern to be operational, in the field of psychological training the first thing to do is to educate shooting coaches by organizing seminars. There also have to be compiled and published the specialized literature which is non-existent in Latvia.

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RELATIONSHIP BETWEEN SELF REPORTED PHYSICAL ACTIVITY, OBJECTIVELY MEASURED PHYSICAL ACTIVITY AND PHYSICAL FITNESS

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Both questionnaires (self reported) and accelerometers (objectively measure) are used to measure individuals' physical activity (PA) level. There is a strong relationship between PA and physical fitness, and the relationship between these factors are of great significance.

The **purpose** of the study was to describe the association between self-reported PA, objectively measured PA and physical fitness measured by waist circumference and maximal oxygen uptake (VO_2max).

A sample of 735 individuals (357 women), with a mean age of 48.5 years (SD 14.4) participated in the study. Physical activity was assessed over seven consecutive days using the Actigraph accelerometer and by answering the short form of the International Physical Activity Questionnaire (IPAQ). Moderate to vigorous physical activity (MVPA) measured by accelerometer had to be bouts of 10 minutes or more, with allowance for interruptions of 1-2 min. VO_2max was directly measured by walking and running on a treadmill using a ramp protocol to exhaustion. Individuals in the high PA-level, categorized by the IPAQ-guidelines, had a 13% higher VO_2max and 3% smaller waist circumference than individuals with low PA-level. Individuals meeting the national PA recommendation of 30 min MVPA per day, measured by accelerometer, had an 8% higher VO_2max and a 4% smaller waist circumference than individuals not meeting the recommendations (Tab 1). The correlation between VO_2max and MVPA was low (.15 and .14 for accelerometer and IPAQ, respectively; $p<.01$). The correlation between VO_2max and waist circumference was -.33 ($p<.0001$).

Tabel 1.

VO_2max and waist circumference in different physical activity levels, categorized by IPAQ and accelerometer

	IPAQ PA level			Accelerometer Meeting national PA recommendations	
	Low (n=306)	Moderat (n=236)	High (n=167)	No (n=561)	Yes (n=168)
VO_2max ($ml \cdot kg^{-1} \cdot min^{-1}$)	35.1 (9.3)	35.2 (9.8)	39.7 (9.6) [A]	35.5 (9.5)[C]	38.2 (10.3) [C]
Waist circumference (cm)	91.1 (12.2)	89.3 (10.9)	88.2 (11.9) [B]	90.7 (11.9)[C]	87.5 (11.2) [C]

[A] Different from low and moderate ($p<.0001$), [B] Different from low ($p<.05$); [C] Different from no ($p<.01$).

Conclusion: Individuals reporting a high PA-level by IPAQ or meet the national PA recommendations measured by accelerometer, have higher levels of VO_2max and a smaller waist circumference. This indicates that both instruments are able to detect differences in these important health factors among the most active individuals.

ANALYSIS OF TECHNICAL ATTACK RESULTS OF HANDBALL CHAMPION TEAMS (KLAIPĖDA "DRAGŪNAS" AND POLVA "SERVITI") FROM LITHUANIA AND ESTONIA IN 2011-2012 BALTIC LEAGUE COMPETITIONS

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Research aim was to analyse and compare the technical attack indices of handball champion teams from Lithuania and Estonia participating in 2011-2012 Baltic league competitions.

Research objectives: compare the accuracy of throws of Klaipėda "Dragūnas" and Polva "Serviti" handball players, assessing throws from side position and from 6 and 9 m lines. We also assessed the efficiency of 7 meter penalty throws, analysed the efficiency of handball team attacks in fast offense and against the minority, as well as goalkeepers in the game.

Results. Attacks are a very significant index of handball game, and their efficiency effect the successful performance in the game. Comparing throws from side position and from 6 m line we see that Polva "Serviti" handball players perform their successful attacks from side position with the accuracy of 60.4%, while Klaipėda "Dragūnas" players – only53.2 % .Throws from 6 meter line are realized by Klaipėda "Dragūnas" players only with the accuracy of 75 %, while Polva "Serviti" handball players perform that with the accuracy of 75.5 %. If we compare throws from 9 meter line, we will see that long distance throws are best realized by Klaipėda "Dragūnas" players with the accuracy of 51.6%, and Polva "Serviti" handball players perform that with the accuracy of 48%. In percentage, the efficiency of fast attacks of Klaipėda "Dragūnas" team of 67.5%, and Polva "Serviti" team - 71.9%. In attacks against the minority Klaipėda "Dragūnas" players are the leaders as they perform their attacks with the accuracy of 64%, while Polva "Serviti" - 61.9%. One of the most important factors of the game is the efficiency of the game, and it determined the team's success. If we compare the goalkeepers, we will see that the efficiency of Lithuanian handball club goalkeeper is 33.2 %, and Estonian – 34.8 %.

Discussion. The analysis of the technical attack indices of handball the World and European champion teams shows that leading teams achieve 40% of goals in fast attacks in competitions. According to our research results, the efficiency of Estonian handball team is higher by 4.5 %. Psychological preparation of the team is also of great importance, which can be seen from 7 m penalty throws. Polva team realises that better by 4%. The efficiency of Estonian handball goalkeepers is higher, and this is determined by their experience and older mean age. We believe that those indices influenced the position of the team in the tournament table.

Conclusions. The analysis and the comparison of technical attack indices of Klaipėda "Dragūnas" and Polva "Serviti" handball players show that the accuracy of throws is markedly different. The accuracy of throws of Klaipėda handball players is 61.9%, and Polva – 66.3%. The efficiency of fast attacks, the goalkeepers' actions and 7 m penalty throws are also of great importance to the game. Those indices influenced the position of the team in the Baltic Handball League contest tournament table.

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THE EFFECT OF CAWTHORNE-COOKSEY EXERCISES ON BALANCE IMPROVEMENT IN OLDER WOMEN

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Introduction. All European countries are experiencing significant ageing of the population. Falls in older adults are a major public health concern [1] and a main cause of morbidity and disability [2]. More than one-third of persons 65 years of age or older fall each year, and in half of such cases the falls are recurrent [2]. To promote health, enhance quality life and reduce falls in older people various interventions may be used: balance training exercises, home modifications, appropriate footwear and walking aids.

The **purpose** of this study was to determine the effect of Cawthorne-Cooksey exercises on balance improvement in older women.

Methods. 28 women aged 55-75 years participated in the study. Exclusion criterions to participate in the study were: stroke, Parkinson disease, multiple sclerosis, knee or hip replacement and fractures. The subjects were randomly divided into two groups: exercise (n=14, mean age 67.9 ± 6.13 years) and control (n=14, mean age 68.9±5.31). Exercise group women performed Cawthorne-Cooksey exercises for 4 weeks, 5 times a week. **Cawthorne-Cooksey exercises** [3] consisted of moving head in sitting and standing positions with eyes open or closed, exercises on a balance platform, and walking around. One training session lasted for 30-35 minutes. No **exercise** was performed in the control group. Static and dynamic balance was assessed using the Berg Balance Scale, Functional Reach Test, and Tinetti Balance Scale, walking speed was assessed using Timed Up and Go Test. Risk for falls was evaluated by Desmond fall risk questionnaire [4]. Subjects were evaluated twice: before and after applying exercise program.

Results. More than 50% of women reported a fall in the past years, difficulties walking in the dark, or on uneven surfaces, or walking a straight line as well as loss of balance, or a light-headed feeling standing up. Only 29% of subjects participated in a regular exercise programme in the past six months. All assessed indicators didn't differ between groups before applying exercise program. The results of Berg Balance Scale in exercise group significantly ($p < 0.05$) improved (from 37.4 ± 7.66 to 48.1 ± 4.58), Functional Reach Test (from 15.6±4.38 to 20.0±4.02), Tinetti Balance Scale (from 15.5 ± 5.32 to 22.9 ± 3.41), Timed Up and Go Test (from 19.4 ± 7.44 to 13.8 ± 4.41). Cawthorne-Cooksey exercises significantly improved patients' static and dynamic balance, reach function and walking speed, while in the control group results of all performed tests had tendency to decline.

Conclusion. Cawthorne-Cooksey exercises were effective in improving balance among older women.

Keywords: older women, balance, Cawthorne-Cooksey exercises.

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MILDRONATE INCREASES AEROBIC CAPABILITIES OF ATHLETES THROUGH CARNITINE-LOWERING EFFECT

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Mildronate (3-(2,2,2-trimethylhydrazine)propionate dihydrate, THP; MET-88) is an anti-ischemic drug developed in the Latvian Institute of Organic Synthesis [1]. Actually Mildronate is used in several countries in cardiology, neurology and other branches of medicine including the sport medicine [2].

Aim of this study was to review literature data about recent studies on mildronate especially in fields associated with physical work capabilities and sport.

The effects of mildronate are extensively investigated; there are 158 reports in PubMed at all (including 25 reports associated with effects on physical capabilities) and 43 (7) reports, respectively during 5 last years. Six review articles are not cited in PubMed.

Mildronate – a structural analogue of the carnitine precursor gamma-butyrobetaine (GBB) inhibits the last reaction of carnitine biosynthesis. Carnitine is a molecule that transports long-chain fatty acids in mitochondria to enter in the beta-oxidation reactions. By lowering the carnitine level mildronate blocks the beta-oxidation of fatty acids which is highly oxygen-consuming process. At the same time the drug shifts the metabolism of the cell toward oxidation of carbohydrates. Mildronate treatment prepares cellular metabolism and membrane structures to survive the ischemic stress conditions [1, 3]. It is very important not only in heart attack or angina pectoris but also during increased physical loads when areas with insufficient supply with oxygen arose in skeletal muscles.

Mildronate lowers consumption of fatty acids in the cells and increases utilization of carbohydrates for production of energy that results in optimization of oxygen consumption in cells and adaptation of the cells to ischemic conditions. Mildronate decreases levels of lactate and urea in blood. Mildronate favors economy of glycogen: level of glycogen and neutral fats increase in the cells during the long-lasting loads. Mildronate increases endurance properties and aerobic capabilities of athletes (freestyle and Greco-Roman wrestlers, judokas, canoers, rowers and volleyball players). Mildronate improves functional parameters of the heart activity, the drug increases physical work capabilities, increases the rate of the organism rehabilitation after maximal and sub-maximal loads, hyper-loads, it activates CNS functions and protects against stress [4].

Mildronate is usually administered to athletes perorally in dose 0.5-1.0 g twice a day before training, as 14-21 day course during training period and 10-14 days before competitions [4].

Mildronate is recommended for use as pharmacological remedy that increases physical work capabilities of athletes. Mildronate and its metabolites are not included in the doping list; it does not provoke any undesired side effects.

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EFFECT OF COLD ACCLIMATION ON THE NEUROMUSCULAR FUNCTION

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Humans can become naturally acclimatized or experimentally acclimated to cold. The specific physiological adjustments that develop vary in three general patterns depending on subjects' physical characteristics, the severity of cold stress, and/or the duration and frequency of cold exposures. Although it is established that cold exposure produces a decrease in physical performance, especially due to the effects of impaired peripheral (muscular) function, there are only a few studies regarding effect of cold acclimation on the neuromuscular function. 2-3 weeks repeated local cold water immersion failed to show any adaptation in the neuromascular function, but after 3 months of whole body cryotherapy was established that neuromuscular function can adapt to cold due to increased activity of agonist and decreased activity of antagonist. According to this study, the effect on the core temperature seems to be minimal, but in our study it was controlled strictly (reaching 35.5±0.1 ^{0}C core temperature). It was also different methodology of testing neuromuscular function in our study, where using isometric contractions of plantar flexors we focused on effect of cold acclimation on peripheral and central function.

According to Jansky et al. (1996) study which showed lower central and peripheral (skin) body temperature after 4-6 weeks whole-body cooling in water (14 ^{0}C, 1 hr, 3 times per week) and referred it to as hypothermic adaptation, it was hypothesized that similar results would recur in our study and hypothermic or insulative-hypothermic adaptation to cold would occur. According to Geurts et al. (2005) study of repeated (3 weeks) local cooling where muscle temperature and electrically evoked twitch didn't increase at the end of acclimation, it was hypothesized that after 16 days of passive cooling muscle temperature wouldn't change drastically, suggesting no changes in contractile properties, and peripheral (muscle) adaptation to cold wouldn't occur. According to Westerlund et al. (2009) study which showed that acute repeated whole-body cold exposure induces neuromuscular adaptation by decreasing co-activation, it was also hypothesized that chronic mild hypothermia is sufficient stimulus to induce central (neural) adaptation and increase central activation, agonist activity and decrease antagonist activity, thereby improve performance of 2 min sustained maximal voluntary contraction (MVC-2min).

The purpose of our study was to investigate the effect of cold acclimation on the neuromuscular function.

The main questions what we wanted to reveal: (1) to observe and evaluate the changes of physiological responses (rectal, skin temperature, heart rate, physiologic stress) during the acclimation period; (2) to establish the effect of cold acclimation on peripheral (muscular) function; (3) to establish the effect of cold acclimation on central (neural) function**.**

Participants were divided in two groups: the first group (experimental) consisted of healthy non-athletes men (n=8) were 16 days passively cooled in cold water (14±1 ^{0}C, head out) to 35.5±0.1 ^{0}C rectal temperature (T_{RECT}). Plantar flexors isometric non-voluntary electrically evoked twitch (EET) torque and contractile properties (contraction time, CT; half relaxation time, 1/2 RT), isometric maximal voluntary contraction (MVC) torque, isometric 2 min fatiguing sustained MVC (MVC-2min) torque, central activation ratio (CAR) and muscle electromiography (expressed as root mean square, RMS) were assessed before acclimation (contral measure), first and last (16 day) days of acclimation. The second group was (control) and consisted of healthy non-athletes men (n=10). They reapeated the same protokol as experimental group but withaut passiv cooling.

Results showed that T_{RECT} fell more rapidly at the end of acclimation. We also observed a significant decrease in skin temperature. EET torque and contractile properties of plantar flexors were deteriorated after cooling in first day of acclimation and no improvement was observed after the acclimation. Acclimation also had no significant effect on brief MVC. CAR improved, muscle agonist activity increased and muscle antagonist activity decreased at the end of acclimation. Due to the increased central activation MVC-2min performance improved, but changes of fatigue index were not found.

The main findings of our study are: (1) After 16 days of passive cooling there was more rapid decrease in rectal temperature and more pronounced decrease in skin temperature, suggesting that insulative-hypothermic adaptation to cold occurred; (2) Cold acclimation didn’t result in significant changes of electrically evoked twitch torque and contractile properties of plantar flexors, suggesting that peripheral (muscular) adaptation didn’t occur; (3) Cold acclimation increased central activation ratio, muscle agonist and decreased muscle antagonist activity of plantar flexors, suggesting that central (neural) adaptation occurred.

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COMPARISON OF TWITCH CONTRACTILE PROPERTIES OF PLANTARFLEXOR MUSCLES IN NORDIC COMBINED ATHLETES, CROSS-COUNTRY SKIERS AND SEDENTARY MEN

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It is well known that exercise training can induce different processes of adaptation in the neuromuscular system through changes in the neural control as well as morphology of the skeletal muscles. Several longitudinal studies have shown changes in contractile proteins expression (Li et al., 2003) and neural adaptations, such as alterations in motor units activation (Van Cutsem et al., 1998) or decreased antagonist co-contraction (Carolan, Cafarelli, 1992) after different training programmes.

The purpose of this study was to compare twitch contractile properties of skeletal muscles in male athletes who train power and endurance simultaneously (Nordic combined athletes, NCA) with athletes who train endurance (cross-country skiers, CCS) and sedentary subjects. Ten NCA, 13 CCS and 14 sedentary male subjects aged 20-26 years participated in the study.

To determine the contractile properties of plantarflexor muscles during isometric twitch, the posterior tibial nerve was stimulated through a pair of 2 mm-thick, self-adhesive surface electrodes (Medicompex SA, Ecublens, Switzerland). The cathode (5 x 5 cm) was placed over the tibial nerve in popliteal fossa and anode (5 x 10 cm) was placed under the posterior-medial side of the thigh. Supramaximal square wave pulses of 1-ms duration were delivered from an isolated voltage stimulator Digitimer Stimulator DS7AH (UK).

Twitch peak force (PF), maximal rates of force development (RFD) and relaxation (RR), contraction (CT) and half-relaxation (HRT) times were measured. The percentage increase in twitch PF after maximal voluntary contraction (MVC) of 5-s duration in relation to resting twitch was taken as an indicator of postactivation potentiation (PAP).

The NCA had a significantly greater ($P<0.05$) resting twitch PF compared to CCS and sedentary subjects, while this parameter did not differ significantly in CCS and sedentary subjects. Twitch PAP was significantly greater ($P<0.05$) in NCA than in sedentary subjects and CCS.

Twitch CT was shorter ($P<0.05$) in NCA compared with other measured groups, while it did not differ significantly between CCS and sedentary subjects. The NCA had shorter ($P<0.05$) twitch HRT compared with sedentary subjects, while there were no significant differences in this parameter between NCA and CCS, and between the CCS and sedentary subjects. The NCA had a significantly greater ($P<0.05$) resting twitch maximal rate of force development RFD compared to CCS and sedentary subjects, while this parameter did not differ significantly in CCS and sedentary subjects. Resting twitch maximal rate of relaxation (RR) did not differ significantly in the measured groups.

In CCS, twitch PAP correlated negatively ($P<0.01$) with resting twitch CT (r = -0.67). No significant correlations ($P>0.05$) were found between twitch PAP and time-course characteristics of resting twitch in NCA and sedentary subjects.

We concluded that twitch contractile properties of plantarflexor muscles differed markedly in athletes who train power and endurance simultaneously in comparison with athletes who predominantly train endurance. As an indicator of the long-term adaptation to simultaneous power and endurance training the increased twitch force-generation and potentiation capacity, and shortening of twitch contraction times in plantarflexor muscles were observed in NCA.

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EXPLORING EFFECTIVE FACTORS ON QUALITY OF PHYSICAL EDUCATION AND PEDAGOGY: PRESENTING A PRACTICAL-CONCEPTUAL MODEL

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It is very crucial to realize effective factors on quality of physical education (PE) and pedagogy for promotion and development of social and cultural learning factors and students' health. This study explored these factors by using descriptive-survey method, theoretical literature and PE specialists' view. We designed a questionnaire and performed a pilot test and its validity was 80.12 percent. We have chosen 1120 primary school PE teachers (655 males & 465 females) in all provinces of Iran randomly. The collected data was analyzed by SPSS software package 19 based on descriptive and inferential statistics. We understood that from PE teachers' view, between affective factors on improving the quality of PE and Pedagogy the curriculum (goals, content, planning, assessment and budget respectively) was the most important factor and insight (student, parent respectively) was the least. By comparison male and female teacher's point of view, there were no significant differences between male and females' view except teaching methods and environment factors. PE teachers' view with different academic degrees have significant differences on curriculum and environment factors. At least based on obtained data and research literature, a practical and conceptual model presented which contained effective factors on quality of PE and Pedagogy.

Key words: Pedagogy, Physical Education, Quality of Education, Effective Factors

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3D CAMERA CALIBRATION FOR MOTION TRACKING IN RECURRENT ATHLETIC ENVIRONMENT

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Introduction: Motion tracking is a widely used technique for kinematic data acquisition from athletes' performance records. 3D camera calibration is required for precise calculation of spatial coordinates of body segments (Kwon, 2008; Payton, 2008). With some motion tracking systems the calibration procedure is highly time-consuming, as it requires movement and capture of a test object in the volume of interest. The aim of the present study was to develop and evaluate an alternative 3D camera calibration method suitable for recurrent environments, which would increase time-efficiency of the calibration procedure. **Methods**: Five video cameras were used for video recording on the iced luge start ramp at 25 Hz rate. A standard camera calibration procedure for Simi Motion tracking system, which involves capturing of calibration videos, was done on the ramp with a 1500 mm long calibration pole and 3 clearly visible markers on it. Marker coordinates were determined using a range- and angle-meters. 3D modelling of the ramp from video projections for innovative calibration procedure was performed using 3D Studio Max software. Calibration procedure using the 3D model repeated the steps of the standard procedure, eliminating the calibration video capture.

Results: 3D model of the ramp was created from projections captured on the videos. Virtual calibration markers with known coordinates of the centres were spread over the model covering the area of interest. The 3D DLT calibration procedure for the cameras (Abdel-Aziz and Karara, 1971) in Simi software can be performed by substituting the calibration videos with corresponding projections of the model and mapping the virtual markers. The projections shall be overlaid the respective movement videos from the cameras in order to obtain the precise alignment of the camera views. Comparison of the calibration results using the standard calibration procedure and the innovative method had shown that the difference in coordinate estimation with the two methods is within a measurement error.

Discussion: A new approach to 3D camera calibration for the purposes of motion analysis was created and tested for the environment of the luging start ramp. The standard calibration procedure with moving the calibration pole over multiple places is a time consuming procedure, which cannot always be performed in the real athletes' testing conditions (Krosshaug and Bahr, 2005). Another shortcoming of this method is its improperness for the sloped surfaces – it is not always possible to keep the same vertical coordinate of calibration markers on the slope in all pole positions, as it is required by the procedure. The proposed calibration method allows overcoming these limitations by creation of the 3D model of the athletes' testing area with predefined virtual markers in the model. Application of this method is justified when the tests are performed repeatedly in the same environment. Camera calibration from 3D area model requires precise aligning of the camera view with the corresponding model projection. Prior estimation of camera position with centimetres precision facilitates alignment of the camera views.

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MODEL DRIVERS

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Introduction: Computer modelling is a powerful research tool, which is often used to simulate and optimize sports movements. Joint angle time histories are required to drive the computer model kinematically, and the former are frequently obtained from motion analysis data (Yeadon and King, 2008). Motion tracking for the athletes in real performance environment is often done with markerless technique (Roemer et al., 2007), and in this case deriving angle time histories is an essentially time-consuming procedure, as it requires digitization of two or three body landmarks for each driven joint. Therefore the aim of this study was to simplify the necessary model drivers from angular to linear and validate replacement of rotational degrees of freedom (DOF) by translation DOF in kinematic chain model.

Methods: A planar 5-segment closed kinematic chain model of a luger performing 2nd and 3rd phases of the start was created using Simulink™ SimMechanics (The MathWorks, Inc.) computer modelling environment; the number of DOF of the model was limited to 3, therefore the model required 3 input drivers. Segment inertia parameters were calculated as in (de Leva, 1996). The model was kinematically driven, and the necessary joint angle time histories were obtained from markerless motion tracking data. Motion capture performed with 2 synchronized high-speed video cameras at 100 fps. The second modelling stage implicated replacement of the rotational joints by custom joints combining rotational and translational DOF. The drivers for the custom joints used time histories of the linear coordinates instead of angles time histories.

Results: Two model types of the same closed kinematic chain were created: a regular model, driven by angles time histories, and a modified model, driven by linear coordinates' time histories. Comparison of the movement simulation results produced by these models had shown that it is possible to derive the same output from both models. However, simulation process with the regular model in some cases required additional constraints to be put on joints' output angles in order to obtain realistic movements of the human body. In such instance the modified model appeared to be more suitable for the simulation task. It was necessary to use custom joints for the modified model, as simple translational joints would not allow producing the necessary range of movements.

Discussion: The modified kinematic chain model uses only linear drivers to perform movement simulation. Using the joints that can be driven by linear coordinates complicates the model itself, but once constructed the model just needs minor changes to simulate the motion. Linear coordinate drivers require only one body landmark to be digitized on an athlete's body for each driven joint, which reduces the data collection time when the number of the necessary drivers is smaller than the number of joints. This allows producing the results with the modified model quicker than with the regular one, which is essential in motor learning (Baca and Kornfeind, 2006). Another advantage of the linear coordinate drivers over the angular ones is avoiding the additional constraints on joints to be introduced into the model. The modified model appears to be suitable for closed kinematic chains where the number of DOF is smaller than the number of joints; in this case the initial complication of the model allows gaining in time during the movement analysis procedure.

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BELIEFS AND SPORT EXPERIENCES OF SENIOR CITIZENS

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Reaching a senior age and retirement opens a new period in human's life. The European Commission supports "active ageing", and 2012 is named the European Year of Active Ageing and Solidarity between Generations. The number of Latvia population aged over 65 has increased by 33.8 thousand since 2000, and their share in the total number of population has grown from 14.8% to 17.4% or by 2.6 percentage points (Central Statistical Bureau of Latvia, 2011).

Senior citizens are rich sources of knowledge and experience in the sports, which they acquired through their courses of lives. This does not only concern professional experience but also the development of positioning as doers of sports through non-formal and informal learning. Older volunteers can offer new and unique perspectives to the development of youngsters` positioning as doers of sports. The development of positioning as doers of sports can also foster senior citizens' personal development and well beeing, as well as gives new possibilities in the senior citizens' life. Research suggests there is a connection between beliefs and behavior in older individuals (Horton et al., 2008). Educational level states humans' beliefs (Dzuka, Dalbert, 2006). **The aim of the study** was to make an investigation of the relationship between pensioners' education, working life and experience in sports, as well as their beliefs and positioning as doers of sports.

The research questions. 1. What is the relationship between pensioners' beliefs and positioning as doers of sports related to the information gathered about their voluntary work? 2. What is the relationship between pensioners' beliefs and their positioning as doers of sports related to pensioners' education, working life and experience in sports?

Methods. The *informants* were n=149 pensioners (n=11 volunteers/pensioners, n=24 employees/pensioners receiving a salary, n=112 pensioners, n=2 volunteers), age from 55 and older, female 62% and male 38%. *Data collections.* A semi-structured online interview for qualitative data collection. *Research design:* According to the objectives and criteria of the investigation the research includes two stages 1) the pensioners were asked to write down their reflections on three questions: *What is sports? What is "sports thinking"? How to solve "sports problems"*? and the pensioners were asked to describe some facts about their voluntary work, which include: the type of voluntary work and the name of the organization; work duration (when they started doing voluntary work – when they started this particular voluntary work – how many hours per month they worked); work purpose (give reason for doing this type of voluntary work); 2) the pensioners' statements about beliefs and positioning were related to the pensioners' education, working life and experience in sports. *Data processing.* Based on the questions that had been asked, broad themes for the responses were established. In accordance with the hierarchical content analysis an inductive approach was used in which categories were identified, meaning units were compared and organized into distinct groups. Relations among the categories were created and analyzed. The table of frequencies of conceptual codes was created in order to validate the data. The relations between metacodes and sub-codes were constructed and analyzed applying MAXQDA10 software and validated applying SPSS17 software.

Results and discussion. The diversity in the responses from our informants indicates the complexity of the issues and the variety of opinions and beliefs seniors hold about sport. Results revealed pensioners' beliefs and positioning on the one hand, and their performances as sports problem solvers on the other. It is crucial for our society to develop a more literate understanding of the determinants of healthy aging and sport.

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MAXIMAL VOLUNTARY CONTRACTION FORCE OF MUSCLES FLEXORS AND EXTENSORS IN CRANIOCERVICAL REGION.

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In literature there is widely discussed a question about different characteristics of craniocervical region. Somatoscopical evaluations of stance reveals widely detectable posture shape of shift of the C0 – C1 joint forward from body vertical axis in sagital plain. Such a posture causes increased lordotic curvature in craniocervical region. To bring a head forward in sagital plain is possible changing contraction forces of involved neck muscles. According literature it is important to maintain good performance possibilities of the deep cervical flexors in support of the cervical lordosis and motion segments and clinical observations of their impairment with neck pain.

The purpose of our investigation was to evaluate functional stability of craniocervical junction.

We evaluate maximal voluntary contraction forces (MVC) of muscles realising head flexion and extension in craniocervical junction in three head positions – neutral, forward noded head and head backwards. There was used electronic dynamometer – The Lafayete Manual Muscle Test System, mod.01163. The head forward position in sagital plain was measured with ruler. Control of cervical vertebra position was performed manually. In this investigation stage participate 25 LASE students in age 20 - 23.

During stance control we find that average head forward position from body vertical axis in sagital plain was 0.055±0.002 m. Nobody of participants of this investigation have ideally normal head and neck posture. Comparing these results with literature we could, assume that everybody have some problems with craniocervical flexors which support maintaining normal cervical lordosis. Results of MVC measurements was - force of head flexion – 79.9 ±4.6 N and extension – 87.7±4.5 N in neutral position; force of head flexion – 93.6±4.6 N and extension – 79.7±4.5 N in forward noded head position; force of head flexion – 49.7±2.7 N and extension – 116.7±9.2 N in head backwards position. Measurements of MVC shows that flexion and extension forces in first two positions are approximately equal. According findings, published in literature such a functional condition of deep craniocervical muscles provides functional stability of craniocervical junction. In position head backwards this situation qualitatively changes. Head flexors become twice weaker neither extensors. In this situation deep head flexors could not maintain normal neck lordosis and head is shifted forward and motion segments in cervical region could be impaired.

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DIFFERENCE IN EXPLOSIVE ISOMETRIC STRENGTH AND RELAXATION CHARACTERISTICS OF LEG EXTENSOR MUSCLE BETWEEN MODERATELY ACTIVE YOUNG AND ELDERLY MEN

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Previous studies demonstrated that total muscle cross-sectional area peaks at the age of 24 years and from the age of 24 to 80 years, skeletal muscle mass decreases approximately by 40 % from total value (1). Quantitative loss of muscle mass or sarcopenia is the most important factor underlying the decline in muscle strength and power with ageing (2). Explosive strength and power, which is an integrated index of force and velocity, decrease with ageing even more than maximal isometric strength of the same muscle group (3). The aim of the present study was to compare the characteristics of explosive strength and relaxation at isometric contraction of leg extensor muscle between moderately physically active young and elderly men.

Fifty-two healthy moderately physically active men were subjects in the study: 17 young men aged 21-26 years and 35 elderly men aged 67-86 years. The elderly men were distributed into two groups – more physically active (MA) and less physically active (LA), based on a physical activity questionnaire for the elderly (4), which was completed during a personal interview. The questionnaire consisted of scores of household activities, sporting activities, and other leisure-time activities of physical nature, resulting in total activity score. The subjects were asked to report their habitual physical activities of the recent year and the activities were classified according to work posture and movements. Explosive strength and relaxation characteristics of leg extensors muscles' isometric contraction were measured with a custom-made isometric leg bench. Peak torque (PT) of unilateral and bilateral isometric maximal voluntary contraction (MVC), rate of peak torque development (RPTD) of bilateral contraction at level of 25 %, 50 % and 75 % of MVC, as well as half-relaxation time (HRT) were measured. Ratios of unilateral and bilateral PT to body mass (PT:BM) were calculated.

Elderly MA and LA men had significantly lower PT:BM ratio ($p<0.001$) of unilateral as well as bilateral leg extensor muscle MVC strength as compared to younger men. There was noted greater PT:BM ratio of bilateral MVC strength of leg extensor muscles ($p<0.05$) in MA elderly as compared to LA elderly group. Bilateral RPTD was significantly lower ($p<0.001$) at all measured levels of MVC strength in both groups of elderly men as compared to younger men and did not differ significantly between the two groups of elderly men. Younger men had shorter HRT of bilateral MVC strength ($p<0.01$) as compared to MA and LA elderly men, while no considerable differences were observed between two elderly men's groups in this characteristic. It emerged that explosive strength may decrease with ageing even more than maximal strength, suggesting that atrophying effects of ageing may be greater in fast-twitch muscle fibres than in slow-twitch fibres and/or that the rate of neural activation of the muscles may also be influenced by ageing (5). The present study demonstrated that MA as compared to LA elderly men had greater bilateral isometric maximal strength generation of leg extensor muscle but no differences were established in explosive isometric strength and relaxation characteristic between the two elderly men's groups.

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LOWER LIMB JOINT KINETICS DURING GAIT IN MEN WITH KNEE JOINT OSTEOARTHRITIS BEFORE AND SIXTEEN MONTHS AFTER KNEE ARTHROPLASTY AND COMPARISON WITH HEALTHY CONTROLS

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Total knee arthroplasty (TKA) is a commonly used treatment in late stages of primary osteoarthritis (OA) with aim to improve quality of life of patients. In recent study a rapid increase in the incidence of arthroplasty among patients with primary knee OA in Finland during 1980-2006 years was demonstrated, especially in those ages 50-59 years – for unilateral arthroplasty from 0.2 to 10 per 100 000 inhabitants and for TKA from 0.5 to 65 per 100 000 inhabitants (1). Three-dimensional (3-D) gait analysis provides a unique method of measuring joint dynamics during daily activities such as walking, including the assessment of functional outcome after TKA (2). The purpose of the present study was to investigate lower limb joint kinetics during gait in men with knee joint OA before and 16 months after TKA.

Eight male patients with knee joint OA in late stages aged 51-74 years participated in the study one day before and sixteen months after unilateral TKA. The control groups consisted of eight healthy age-matched men. Spatiotemporal parameters and kinetic characteristics of knee and ankle joint during gait cycle were measured using 3-D movement analysis system Elite Clinic (BTS S.p.A, Italy). Isometric maximal voluntary contraction (MVC) force of quadriceps femoris muscle was assessed by custom-made dynamometer. Active range of motion (ROM) of knee joint was measured by standard goniometer. Knee joint function was evaluated by the Western Ontario and McMaster Universities Arthritis Index (WOMAC).

OA patients demonstrated a significant ($p<0.05$) improvement of knee joint function as well as a decrease in knee pain and tendency to increase of isometric MVC strength of quadriceps femoris muscle 16 months after TKA as compared to pre-operative data. Increase of gait velocity and prolongation of stride length were found in OA patients 16 months after TKA ($p<0.05$) in comparison to pre-operative values, but these characteristics were significantly lower ($p<0.01$) as opposed to age- and gender-matched healthy controls. Patients had shortening of stance time of the operated leg after TKA as compared to the pre-operative level ($p<0.05$); this value was also lower in controls ($p<0.001$). Significant increase ($p<0.05$) of knee and ankle joint moments during flexion and extension was found in OA men postoperatively as compared to pre-TKA. In previous study was noted that pre- surgery gait pattern in patients with OA scheduled for TKA are an important determinant of post-surgery gait (3). Associations of knee kinematics and kinetics abnormalities with co-contractions in muscular activation pattern during loading acceptance were found after TKA (2).

In conclusion, improvement of gait characteristics was noted 16 months after TKA, but results of patients remained significantly poorer than data of age- and gender-matched controls.

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ASSOCIATION OF AMPD1 C34T POLYMORPHISM WITH PHYSICAL PERFORMANCE OF LITHUANIAN ATHLETES

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Introduction. The skeletal muscle-specific isoform of adenosine monophosphate deaminase (*AMPD1*) gene seems to be an important regulator of skeletal muscle energy metabolism during exercise. A nonsense C34T mutation in the *AMPD1* gene ends in a premature stop codon, consequently stopping protein synthesis. *AMPD1* C34T polymorphism (rs5810761) has been shown to determine an exercise capacity and cardiorespiratory response to it. The purpose of this study was twofold. First, we determined the frequency distribution of the C34T mutation in a group of top-level Lithuanian athletes (n=193). This group was compared with randomly selected Lithuanian healthy non-athletes (n=250). The second aim of this study was to compare common anthropometric measurements, laboratory indices of muscle strength (grip strength, vertical jump) and endurance performance (maximal oxygen uptake) within the group of athletes depending on their C34T *AMPD1* genotype.

Methods. In total, 193 Lithuanian athletes (152 male and 41 female, age 22.0±6.3 years) of regional or national competitive standard were recruited from different sport groups. The athletes were prospectively stratified into three groups: endurance-oriented (n=77), power-oriented (n=51), mixed group (n=65). Genotyping of the *AMPD1* C34T was performed using polymerase chain reaction and restriction fragment length polymorphism analysis methods. Vertical jump (counter-movement) test was used for the estimation of the short-term explosive muscle power (STEMP). Aerobic capacity function was determined using the maximum oxygen consumption (VO_2max). Anthropometric measures and grip strength were also estimated. Deviation from the Hardy-Weinberg equilibrium (HWE) was statistically evaluated. Genotype and allele frequency differences between groups were assessed by chi-squared test. The average differences for each genotype of Lithuanian athletes' phenotypic indices were evaluated by one factor ANOVA. The influence of genotypes on the phenotypic variables was assessed by creating linear regression models.

Results. Results showed that the *AMPD1* C34T genotype frequency distribution was in line with HWE within all groups (P>0.05). There were more power-oriented group athletes with *AMPD1* CC genotype (86.3%) compared to the endurance (76.6%, P=0.32) and mixed group athletes (64.6%, P=0.009). No significant allele or genotype frequency differences between the athletes and the controls were found. Results showed that the height, weight, muscle mass, handgrip strength and STEMP were significantly different with respect to gender (P<0.05). All of the power-oriented group athletes irrespective of the genotype had higher muscle mass, handgrip strength and STEMP compared to other sports groups. Regression analysis of all the athletes showed that *AMPD1* genotype, gender, sport category, fat mass and muscle mass have strong impact on grip strength (R^2=0.66). The high muscle mass and low fat mass for an *AMPD1* CC genotype men athletes leads to the improvement of grip strength. The STEMP depended significantly on sport category, gender and *AMPD1* genotype (R^2=0.56). There is positive relation between the men carrying *AMPD1* CC and CT genotypes and speed-power characteristics. VO_2max did not differ (P>0.05) between athletes depending on their C34T *AMPD1* genotype.

Discussion. The present results suggest that athletes with the TT genotype of the *AMPD1* gene have reduced exercise capacity. Our data suggest that the C allele may help athletes to attain elite status in power-oriented sports. That's why *AMPD1* gene might be thought as one of the molecular markers of power performance of athletes. In conclusion, the *AMPD1* CC genotype Lithuanian athletes have the potential to achieve high results in speed/power requiring sports, therefore the researched polymorphism of *AMPD1* gene can be used as a criteria for sport type selection. It is worth noting that the development of a phenotype is not a product of a single gene exclusively. Therefore, assessment of sporting potential would be more informative taking into consideration a combination of several genes.

THE TRAUMATISM PREVENTION OF A BOXER DURING THE TRAINING PROCESS

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Introduction. Boxing is a popular kind of sports, which is related to a single combat group. Athletes, who go in for boxing have a good physical condition, a quick response, endurance, static and dynamic strained attention which is directed to master opposition of an opponent during the exchange of punches in single combat's time. The level of especially composed training should be higher nowadays in order to be able to promote the development of boxing. There should be more supplies of the equipment to decrease injuries. The training process should be used more effectively to give maximum results from a boxer and get his nimbleness in prime.

Boxers should understand that systematic exercising, taking into consideration the periodicity of classes, is a must, otherwise it may lead to a bad health and the risk of getting injuries will arise.

Aim: The research aim is the improvement of the training process of Latvian boxers including a routine of especially composed exercises, based on injury research. The object of the research is strength developing of upper extremities of boxers during the training process.

Methods: Analysis of the literature sources, radiology, computer tomography conclusions, testing, mathematical statistics.

Results: The results of radiology we stated, that it is typical for our expremental group of boxers to get injuries in upper extremities fracture and it reaches 29 % of overall injury variety. Bruises take the second place 24 %. Scratches and ligaments damages make a smaller percentage 12 % each. Rarely boxers of this age can have muscle injuries, it makes 6 % each of overall injury variety.

The average result of the left arm power in the beginning is 53.60 kg, right arm power 53.65 and in the end of experiment 54.68 and 54.55.

The average result of the bench press test in the experimental group in the beginning is 76.13 kg, and in the end of experiment 82.75 kg. Average growth is 6.63 kg.

The test results make evident that the worked-out routine includes exercises for forearms, upper arm muscles and shoulders girdle and it is effective as these exercises are closely related to boxing. All these indices reflect positively and effectively because they are aimed to develop the muscles of upper extremities.

Conclusions:

1. Having investigated the results of radiology we stated, that it is typical for our experimental group of boxers to get injuries in upper extremities fracture and it reaches 29 % of overall injury variety. It gives evidence that it is a serious problem. Bruises take the second place 24 %. Scratches and ligaments damages make a smaller percentage 12 % each. Rarely boxers of this age can have muscle injuries.
2. The average result of the bench press test in the experimental group in the beginning is 70 kg, and int the end of experiment 85 kg. Average growth is 15 kg. The test results make evident that the worked-out routine includes exercises for forearms, upper arm muscles and shoulders girdle and it is effective as these exercises are closely related to boxing. All these indices reflect positively and effectively because they are aimed to develop the muscles of upper extremities.
3. As a result of the experiment we conclude that the worked–out programme is suitable to the group of muscles mentioned above, as well as it is effective in the prevention of injuries.

INNOVATIVE LATVIAN SPORTS SECTOR STRATEGIC PLANNING MODEL

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In Latvia sports strategic planning is governed by Latvian Sports Policy Guidelines 2004 - 2012 and the Latvian National Sports Development Program 2006 - 2012. Since the programs will soon be finished and the work on the development of a new strategy has been started, it is necessary to examine the impact of these documents on sports development.

In Latvian Sports Policy Guidelines 2004 - 2012 (primarily Document was approved for the period 2004-2009) is given a description of the situation in Latvian sports sector; formulated problems, the solution of which is necessary to implement definite government policies; defined the basic principles of sports policy, sports policy goals and objectives; formulated expected results of the implementation of the policy; provided achievement indicators and the directions of activities, as well as the estimation of its impact on the State Budget, and described the expected follow-up, reporting and evaluation procedures. As the spheres of sports policy are defined - sports for all, children and youth sports, high-achievement sport and disabled sports.

In Latvian National Sports Development Program 2006 – 2012 (hereinafter referred to as LNSAP), in its turn, objectives are outlined in the following areas - children's and youth sports, high-achievement sports, sports for all, disabled sport and sports facilities. In the Program for each objective are defined execution time, budget, responsible/involved person, as well as the planned outcome.

Aim: to develop innovative Latvian sports sector strategic planning model.

Research methods: document analysis and survey: were surveyed general secretaries of Latvian sports federations, employees responsible for sport in Latvian regions, and sports sector experts.

Using the method of document analysis, present strategic planning documents Latvian Sports Policy Guidelines 2004 - 2012 and Latvian National Sports Development Program 2006 – 2012, and survey of the representatives of sports sector, was developed a new sports strategic planning model, which provides that:

- for strategic planning of sports sector it is necessary to have one document, in which is combined state sports policy and the plan of its implementation;
- tasks should be planned according to the directions of action: development of legislation acts, system of competitions, education and publicity work, international relations, education of specialists, financial provision, sports facilities and information resources;
- period for sports sector strategic planning is two Olympic cycles (8 years);
- each and every year should be carried out the evaluation of the implementation of sports sector strategic planning document, and after the evaluation, if necessary, should be made changes to the strategic planning document.

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VIDEO AND COMPUTERISED SOCCER MATCH ANALYSIS TECHNOLOGY

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The **aim** of our study was to recognise and evaluate the effectiveness of playing performance of 15-17 years aged soccer players.

Subjects and methods. The effects of video and computer technology on the analysing, evaluating and improving of playing performance cannot be ignored. Notational analysis is known and used by the researchers (Vosylius, 1997; Carling, Williams and Reilly, 2005; Суворв, 2007; Журид, 2007; Тенцзюнь Тянь, 2008). They used video recordings to look into individual players and team performance during a match. Our analysis was made according to all known and used playing perfomance knowledge and evaluation methods. We analyzed two matches, that were played on Lithuanian youth sports school and club teams football championship in 2009-2010. We tried to evaluate individual technical and tactical actions and their effectiveness. 14 young soccer players (aged 15–17) from football club „Rotalis“ took part in this research. We registered the main actions in a defense and in an offensive play (balls won, tackles, fouls committed, fouls suffered, passes forward, passes backward, long passes, crosses, individual play (dribble, 1 on 1 play etc.), balls lost, shots on-goal). A playing area was devided into 15 zones. In case of unsuccessful action we noted the error on which the failure occurred. Statistical data analysis was done using Microsoft Access software by entering technical and tactical player action data to the database table and then extracting various statistical reports using SQL language constructs.

Results. Our research showed that young soccer players have made 607–665 technical and tactical actions and unsuccessful actions from them were 163–183 (26.85–27.52 %). We registered 187–194 (29.17–30.81 %) defensive actions (tackles, balls won, fouls committed) and 420–471 (69.19–70.83 %) offensive actions (passes forward, passes backward, long passes, crosses, shots on-goal, individual play (dribble, 1 on 1 play etc.), balls lost, fouls suffered). This technology let us to evaluate players performance effectivenes in different fifteen zones. Data can be analysed in different ways, for example players activity in different zones or interaction between two players and so on.

Conclusions. Our method of playing perfomance analysis, helps to understand better and evaluate the effectiveness of players individual actions as well as the whole teams‘ actions and on that ground to improve the education and training system.

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PHYSICAL ACTIVITY, ATTITUDE OF HEALTH AND EDUCATION AMONG URBAN AND RURAL SCHOOLCHILDREN

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Scientist (Jankauskienė, 2008; Masiliauskas, 2009) who studied physical activity of Lithuanian schoolchildren state that physical activity among senior pupils is not appreciated as the mean of improvement of health and quality of life, that schoolchildren speared little time for that.

Purpose. To examine the physical activity, attitude of health and education among 15–17 years aged urban and rural schoolchildren. **Methods.** In 2010 year 400 schoolchildren from randomly selected schools in two Lithuanian city and two Lithuanian district region take part in the study. Urban schoolchildren were 200 (101 boys and 99 girls) and rural schoolchildren were 200 (99 boys and 101 girls). Schoolchildren are randomly questioned by the closed type questionnaire, made according HBSC questionnaire.

Results. Table 1 demonstrated that physical activity during past seven days of urban and rural schoolchildren were similar. Half of them were moderates physical activities. More urban schoolchildren leisure time were slightly than intensive physical activities (p=0.001). Rural boys there were more intensive physical activities than girls and urban boys (p=0.002) and rural girls there were more moderate physical activities than urban girls (p=0.004).Comparing with data of other authors (Zaborskis, Petronyte 2008) we concluded that the number of physicaly active senior people is reducing. Our data of more intensive physical activity of rural boys require futher investigation. Rural schoolchildren were more sporting stand-alone, in schools sports or dance circle, while urban more sporting in sports club or schools sports circle (p=0.0001).

Table 1.

Physical activity and attitude to own health of urban and rural choolchildren (proc.)

	Urban			Rural		
	All	Boys	Girls	All	Boys	Girls
Intensive physical activities	16.0	22.0	10.0	20.5	41.0	0
Moderate physical activities	50.5	56.0	45.0	56.0	46.0	66.0
Slightly physical activities	33.5	22.0	45.0	23.5	13.0	34.0
Perfect health	0	0	0	24.0	24.0	24.0
Enough health	68.5	80.0	57.0	51.5	59.0	44.0
Being off color	31.5	20.0	43.0	24.5	17.0	32.0

Attitude to own health among urban and rural schoolchildren were different. Rural schoolchildren often indicate being in perfect health nor urban (p=0.001), than urban schoolchildren often indicate their health as enough nor rural (p=0.004). The neither boys nor girls more often indicate that being enough health (p=0.004). Attitude that schoolchildren's health being off-color were the same. Against good opinion about own health our respondents indicated various psychosomatic complainte as often (25.0 proc) as data of other authors (Medonis, Blauzdys, 2009). Urban boys often feeling bad temper, bad moods, nervous stress, girls often feeling head ache, belly ache, bad temper, laxity. Rural boys and girls feeling eine complaints.

Urban and rural schoolchildren place that information about health and healthy lifestyle during lessons getting poorly. About health and healthy lifestyle were learning more urban schoolchildren during physical exercise lessons (58.9 proc and 15.5 proc), and rural schoolchildren – during nature discipline (61.5 proc and 32 proc). Only 5 proc of urban and 3.9 proc of rural schoolchildren about health due to get from teachers. More schoolchildren's get information from parents (26.5 proc and 26.9 proc), urban schoolchildren 28.5 proc and rural 17.0 proc from media and medical persomal (28.6 proc and 38 proc).

Conclusions:

1. Among schoolchildren non popular intensive physical activities, except rural boys. Slightly physical activities were third of urban and fourth of rural schoolchildren.

2. Rural schoolchildren more often indicate perfect health nor urban. Against good opinion about own health urban and rural schoolchildren often feeling psychosomatic complaints.

3. About health more schoolchildren got neither from parents and medical personal nor from teacher. Schools needs intensity as formal, as nonformal health education.

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MOVEMENT´S ANALYSIS AND WEIGHT TRANSFER DURING THE GOLF SWING OF ELITE GOLF PLAYERS

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The **purpose** of this study was evaluation of intra-individual and inter-individual stability of performance and relational analysis of selected parameters in players with different success in professional golf competitions. Some studies have performed a kinematic analysis with clubhead speed used as power generation indicator (Meister et al., 2006; Fradkin et al., 2004) A successful swing which depends on the performance of a complex sequential action of all body segments (Richards et al., 1985) and its repeatability is the key to success in competition.

Four right handed male elite golf players (aged 29 ± 8 years; height 1.835 ± 0.055 m; weight 69.5 ± 10.7 kg) participate in this study. One of them was best placed professional player in Czech Republic players rating (P-1). The force plates KISTLER, which were built-in in the floor, were synchronously connected with a 3D kinematic analyzer CODA Motion System (Charmwood Dynamics Limited, Leicestershire, England). Parameters evaluated and correlated with CHS in this study were angles between target line and shoulders (S-TL) and hips (H-TL), angel between shoulders and hips also called X-factor (S-H) and relative force acting under right (RF) and left (LF) lower limb. These parameters were evaluated in eight phases of the golf swing: Set-up (1), Mid Backswing (2), Late Backswing (3), Top of backswing (4), Early downswing (5), Mid Downswing (6), Impact - Ball contact (7); Follow through (8).

Results show high correlation between selected parameters and clubhead speed (Figure 1) and intra-individual and inter-individual stability of performance (Figure 2). Results are shown for P-1 and all professional players (PP) included P-1.

Table 1

Correlation between CHS and observed parameters in OP and P-1

			S-TL	H-TL	S-H	RF	LF
AP	Club head speed	Pearson Correlation	.576	.784	-.131	-.598	.864
		Sig. (2-tailed)	.000	.000	.088	.000	.000
P-1	Club head speed	Pearson Correlation	.621	.790	-.273	-.454	.835
		Sig. (2-tailed)	.000	.000	.020	.000	.000

Table 2

Intra-individual and inter-individual stability of performance in CHS parameter

		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
P-1	**Average**	0.04	6.74	10.87	0.20	15.27	24.72	26.21	20.42
	CV	0.00	3.31	5.54	12.55	3.20	1.05	1.57	2.50
	CI95	0.00	0.14	0.37	0.02	0.30	0.16	0.25	0.32
AP	**Average**	0.04	7.51	8.28	0.53	13.08	22.55	24.63	18.18
	CV	0.47	10.56	24.21	61.36	12.64	7.81	5.55	11.79
	CI95	0.00	0.26	0.65	0.11	0.54	0.58	0.45	0.70

These data suggest high relation between clubhead speed and body segments movement during the golf swing, including impact phase which is in agreement with the study by Meister et al. (2006). In this study they were not to find correlation between weight shift velocity and golf club speed. Our study suggests correlation between relative force produced by lower limbs and CHS. High intra-individual stability of performance were found in best Czech professional player and also highest golf club speed were found at impact phase (7) related to all players. Results of inter-individual stability of performance show different timing of the swing between players. It is important to note that sample size was small. Results confirm that repeatable and powerful swing is needed to be successful in golf competitions.

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BENEFITS OF RECREATIONAL, LOW-INTENSITY GYMNASTICS TO CHILDREN'S BONE HEALTH: A 2-YEAR SEMI-LONGITUDINAL STUDY

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It is well known that mechanical loading activity on bone is vitally important for skeletal strength and development (Eliakim et al. 2002; Khan et al. 2001). Of different exercise modalities, high-impact activity (such as gymnastics) seems to be especially osteogenic (MacKalvie et al. 2002). Scerpella et al. (2003) observed a dose-dependent relationship between bone mineral density and hours per week of gymnastics activity in prepubescent gymnasts. We have previously reported that children benefit even from the low levels of gymnastics exposure: young recreational and precompetitive gymnasts had greater bone strength at the wrist compared to children participating in other recreational sports (Erlandson et al. 2011).**The aim** of this study was to investigate whether the previously observed effects of recreational gymnastics on bone density, mass, and estimated strength in prepubescent children are maintained over a 1-year period.

One hundred and eight children from the previously described sample (Erlandson et al. 2011) underwent the repeated measurements after a 1-year period. At baseline, the participants (17 gymnasts, 47 ex-gymnasts, and 44 non-gymnasts) were between 4 and 9 years of age (mean = 7.1 ± 1.3). Bone mass, density, structure and estimated strength were determined using peripheral quantitative computed tomography (pQCT) at the distal (4%) and shaft (65%, 66%) sites in the radius and tibia. Univariate analysis of variance (ANOVA) was used to examine the differences between the groups for the change percentage in anthropometric characteristics and bone variables, i.e. total bone content (ToC), total bone density (ToD), total bone area (ToA), and estimated strength (BSI) at the distal sites and ToA, cortical content (CoC), cortical density (CoD), cortical thickness (CoTnk), medulary area (MedA), and estimated strength (SSIp) at the shaft sites.

Over a 1-year period, there were significant increases in ToC (21.4 ± 17.9 %) and ToA (18.9 ± 17.8 %) at distal radius in gymnasts comparing to non-gymnasts and ex-gymnasts. Additionally, significant differences were observed in the increase in BSI (24.2 ± 19.8 %) and CoC (15.1 ± 12.7 %) in radius at distal and shaft sites, respectively, in favor to gymnasts vs. ex-gymnasts. In tibia at the shaft site, the significant differences were found in the increases in CoC (12.8 ± 4.3 %), CoA (11.0 ± 5.9 %) and SSIp (21.5 ± 8.2 %) in ex-gymnasts comparing to non-gymnasts.

This data suggests that involvement in recreational, low-intensity gymnastics at an early age appears to positively affect bone health of young children and that this effect is maintained one year later if the children remain in the sport.

OLYMPIC EDUCATION SIGNIFICANCE OF THE YOUTH OLYMPIC GAMES

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Introduction: Up to now have been held already two Youth Olympic Games (YOG) for young people aged 15 - 18 years: in Singapore in August 2010 – in summer sports, and in January 2012 – in winter sports.

In classical Olympic Games also take part mainly young people. Why do young people need another Games - theirs? The opinion of A. Vrubļevskis, President of Latvian Olympic Committee, is as follows: “To help young people to see real values at the time, when important choices in life are made. Also, as an alternative to classical Olympic Games, which are becoming more and more commercial, expensive and elitist".

Aim: evaluate the role of the Youth Olympic Games in the context of Olympic education.

Research methods: analysis of scientific literature and a questionnaire.

It is essential that YOG have also a very extensive educational and cultural program. Each participant brings from the Games not only the results of the competitions, but also new knowledge about people, about other countries and nations, the relationship between them, also about the role of sport in people life and in the whole world of today.

Olympic education and culture programs are those, which ensure that Youth Olympic Games are more valuable than the classical Olympic Games. In addition to sporting events takes place a special culture and education program, the aims of which are to promote the Olympic values, as well as share the opinions and experiences characteristic of different cultures, making the world YOG a unique sports and cultural festival.

Culture and Education Program (CEP) is one of the most important parts of Youth Olympic Games, it is the aspect that sets it them apart from classical Olympic Games. Cultural and educational program is worked out in such a way, that it can be integrated in YOG and so that it attract new sportsmen to take part in it.

Through interactive, fun and educational activities, the CEP aims to inform about the Olympic Values and encourage the athletes to reflect on their behaviour and on how they might integrate the Olympic Values into their daily lives. In order to turn our vision into reality and to make the CEP a success, we have developed a concept consisting of learning, contributing, interacting and celebrating:

- learning more about global issues, the Olympic Movement, Olympism and sport;
- contributing to a positive impact on the environment and tackling global issues with the motivation and energy of the CEP;
- interacting with other athletes and developing respect and friendships;
- celebrating the Olympic Values and the diversity of the world’s cultures while experiencing the Olympic Spirit’s power to unite different cultures and peoples.

The program World’s First Youth Olympic Games included a variety of activities, which were found in various workshops. It was all available in Innsbruck Congress Centre where the program organizers developed interactive and diverse environment.

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RELATIONS BETWEEN EXERCISE MOTIVATION AND RISKS FOR OVERTRAINING IN RECREATIONAL ATHLETES. A PILOT STUDY

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Introduction: Individuals engage in physical training for a variety of reasons which are described by motivational determinants of behaviour. Most frequently motives such as enjoyment, social interaction, positive affective responses and perceived accomplishment have emerged. However, very little is known about the motivational antecedents of overtraining risks. **The aim** of the present study was to investigate the relationships between various motivating factors and self-reported risks for overtraining and exercise dependence in a sample of recreational athletes.

Method: Data were collected from a cross-sectional survey in a sample of volunteer recreational athletes (41 males aged 18-24 years and 50 females aged 18-34 years). Participants completed three questionnaires: *Estonian 2 x 2 Acievement Goals in Sport Questionnaire* (Utsal, 2010; original by Wang, Biddle, & Elliot, 2007) was used to measure tendency to emphasise mastery and performance motivation; *Modified Estonian Exercise Motivation Questionnaire-2***,** (EMQ-2EM, Matsi, 2009; original by Ingledew, Markland, & Medley, 1998) assessed 7 exercise motives; and an original *Estonian Exercise Belief and Overtraining Scale* was designed to estimate potential self-reported risk factors for overtraining and exercise dependence.

Results indicated that motivational orientation was a significant predictor of variables related to overtraining and exercise dependence. Specifically, multiple regression analysis showed that perceived importance of exercise was significantly predicted by mastery approach and performance approach motivation (R^2 = .24, $F(2,80) = 5.56$, $p < .00001$). Withdrawal effects, a hallmark for exercise dependence, could be predicted by mastery approach motivation (R^2 = .10, $F(1,81) = 8.42$, $p < .01$). Tolerance symptoms, also indicative for exercise dependence, appeared to be related with all aspects of mastery and performance motivation (R^2 = .19, $F(4,78) = 4.47$, $p < .01$). However, mastery approach also significantly predicted intentional avoidance of overtraining (R^2 = .09, $F(1,81) = 7.58$, $p < .01$).

Further correlational analysis showed significant relations between specific exercise motives and overtraining risks. Specifically, higher motives to improve physical appearance, engage in competitive activities, enjoy exercise and relaxation, and improve physical fitness were significantly related to higher tendency to overtraining and exercise dependence.

The principal **conclusions** of this pilot study suggest that potential risks for overtraining and exercise dependence are quite strongly related to various motivational aspects. Further investigation is needed to develop psychological assessment instruments to differentiate between normal and healthy exercise motivation and markers of overtraining and exercise dependence potential.

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EATING BEHAVIOR IN AESTHETIC SPORT: WHAT DO ATHLETES DO AND COACHES THINK?

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Introduction: Previous research has shown that athletes have a higher risk for disordered eating compared to general population (e.g. Smolak, Murnen, & Ruble, 2000). In this study we focused on disordered eating behaviour in aesthetic sports. Specifically, the first **aim** of this study was to estimate if the athletes in aesthetic sports display more frequent disordered eating behaviour than athletes, who's sport does not stress the aesthetic aspects. Second **aim** of this study was to assess how accurately can coaches evaluate their athletes´ eating behaviour and attitudes towards eating.

Method: The study was conducted on a sample Estonian athletes and their coaches, who filled in the *Eating Disorder Inventory -2* (Garner, 1991) in Estonian (Podar, Hannus & Allik, 1999). Athletes filled in the questionnaire in first person while their coaches were asked to estimate how much do their athletes display symptoms of eating disorders – coaches filled in the questionnaire in third person form. Subjects were female figure skaters (n = 23), rhythmic gymnastics (n = 29) and their coaches (n = 12). Controls were female tennis players and basketball players (n = 18) and their coaches (n =2). All athletes were between ages of 12-26 years.

Results showed that athletes of aesthetic sports do not show more frequent or severe disordered eating behaviour than athletes who´s sport does not stress aesthetic aspects. Figure skaters scored significantly higher than rhythmic gymnastics in maturity fears ($p < .01$). In addition, age and athletic experience were positively related drive for thinness in figure skaters. Moreover, age was also positively related to perfectionism in figure skaters. The high frequency of bulimic behaviour was not significantly related to age, but significantly positively related to the athletic experience. Results demonstrated that coaches can partly evaluate the intensity of disordered eating in their athletes (Figure 1). Most importantly, coaches significantly underestimate their athlete´s disordered eating behaviors and attitudes towards eating in terms of bulimic behavior and drive for thinness.

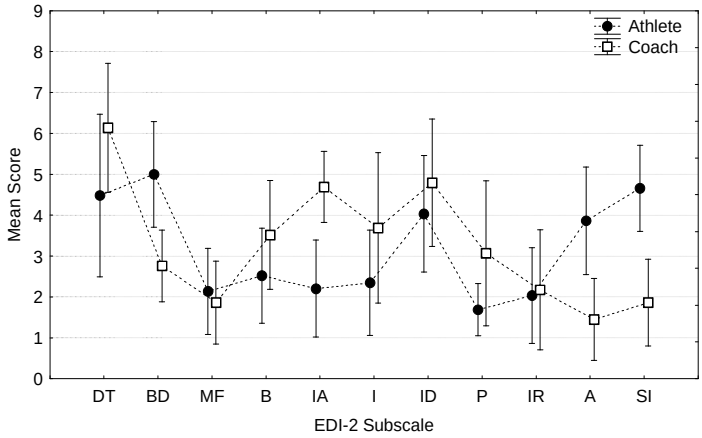

Figure 1. Concurrency of the scores of aesthetic athletes and evaluations of their coaches in symptoms of eating disorders.

DT = Drive for Thinness; BD = Body Dissatisfaction; MF = Maturity Fears; B = Bulimia; IA = Interoceptive Awareness; I = Inefficacy; ID = Interpersonal Distrust; P = Perfection; IR = Impulse Regulation; A = Ascetism; SI = Social Insecurity. Mean scores and 95% confidence limits are presented. Coaches significantly underestimated their athletes' Drive for Thinness and Bulimia.

In conclusion, we found that athletes in aesthetic sports do not differ from ball players when it comes to disordered eating behavior and attitudes toward eating. However, more attention should be payed to coaches`knowledge about eating behavior and disordered eating.

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THE EFFECT OF PERCEIVED TEACHER BEHAVIOUR ON AFFECTIVE OUTCOMES IN PHYSICAL EDUCATION: A CROSS-CULTURAL EVALUATION

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Previous research, based on self-determination theory and using motivational sequence model (Social factors → Psychological Mediators → Motivation → Consequence), has shown that students' perception autonomy support from teacher predicted physical activity behaviour in leisure time context as one of the main outcome of school physical education (PE). Also, the effect of psychological need satisfaction on affective outcomes of PE has investigated. However the effect of the perceived teacher behaviour, including the controlling beyond the autonomy supportive behaviour, on affective outcomes is not still unexplored. Therefore, to resolve this issue the motivational model is proposed in which the effects of the perception of these two types of teacher behavior on affective outcomes of PE are observed.

Participants were 3545 school students aged 12 to 18 years from Estonia, Latvia, Lithuania, Spain and Hungary. Students' perception of teacher behavior was assessed by the items presented by Reeve and Halusic (2009). Motivational types of students and psychological need satisfaction were estimated using the items presented by Standage et al (2005). Affective outcomes in PE interest/enjoyment and effort/important in PE were measured by the items adapted from IMI (McAuley, E., et al., 1989). Physical self-esteem was measured by the scale from PSDQ (Marsh, H. W., & Redmayne, R.S. 1994). A structural equation modeling procedures were used. The comparison of the model components was made by the independent t - test.

The fit indexes of the model presenting the effects of the perceived teacher behavior on affective outcomes via psychological need satisfaction and motivation were acceptable (NNFI = 0.97, CFI = 0.97 and RMSEA = 0.06). The model explained 39%, 45% and 77 % of the variance in physical self-esteem, effort/important and interest enjoyment, respectively. The total effect of autonomy supportive behavior on effort/important and interest/enjoyment was significant 0.34 and 0.59, respectively, but not on physical self-esteem. The total effect of perceived controlling behavior on effort important and interest/ enjoyment and physical self-esteem was significant 0.37, 0.35 and 0.66, respectively. The perceived two types of teacher behavior differed significantly in most of the national groups. Less differences among national groups were followed in respect of perceived psychological needs satisfaction and motivation.

The results of the proposed model highlighted beyond the autonomy supportive behavior also the role of perceived controlling behavior on affective outcomes. The presented model with different cultural background allows to make more generalization of the results.

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THE PHYSICAL ACTIVITY CHILDREN OF SCHOOL AGE

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Introduction: Problems of food and children's health attitudes and behaviors associated with certain life style and even more specifically physical activity of children of school age. A persistent physical activity, even if this creates amoderate significant health benefits, benefis that include good humor self self-esteem, better physical appearance, reduction of obesity, hypertension, cardiovascular disease, diabetes and osteoporosis. (Susan G. Millstein., Anne C. Petersen 1993) At school dedicates a considerable exercise of physical activity not only in the curriculum of physical education at, but also in other development activities with outdoor fun, entertainment and health. (Subashi. G., Daci. J. 2004).

Material and methods: The research uses the case method, simple, with the questionnaire. School 9-years children were asked age 9 years (+ /-1y.), 12 years (+/-1y.) and 15 years (+ /-1y). In total 8 schools were selected in 2 cities, Tirana (6 schools) and Berat (2 schools). This sample of about 500 (+ / -10) questionnaires for each genre, manages to provide an error + / -3%. (Gaxho I. 2002). In 1000 the standard questionnaire with most questions closed, only 879 questionnaires were collected, with a 87.9% response. Of the total collected questionnaires resulted in 387 girls or 44% and 492 boys or 56%.If we refer to the distributionof questionnaires by age, have 61 or 7% of respondents age 9 years,519 or 59% with age12 years and 290 or 33% by age 15 years, 9 or 1% did not answer.

Results: From the data evidence than 616 questionnaires or 70% of children make physical activity of up to four days weekly. They divided by gender: 221 girls and 395 boys, most of them 543 are members of sports teams ages. Sports their favorite are: football, hand games, individual sports for boys and hand games, individual sports for girls, while 73 exercised individually with games, entertainment locomotor, bicycle, outdoor runs etc. Children who develop physical activity 5-6 days a week are 141 or 16%. They are divided by gender: 64 girls and 77 boys. These children have favorite spots, artistic and rhythmic gymnastics, swimming, choreographer, sportdances, folkdances, sport and general aerobic. Not perform physical activity of 105 or 12% of children, where 72 girls and 33 boys. 17 or 2% of the submitted unanswered questionnaire.

Conclusions: From the above data we note that generally has a down ward trend in the number of Albanian children physically active, which is an increasing problem for their health. A factor that affects the development of physical activity of children is the lack of play grounds in these residential areas. In these centers, play grounds are "thrilled" by the multi storey buildings and no longer exist, depriving children of the opportunity to perform physical activity.

- Another reality "bitter" is that in new residential centers that are established in all major cities is intended only for housing but not for social facilities, including sports grounds. (Dashi. T. & E. 2007).

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LINKS BETWEEN BASKETBALL PLAYERS' AGGRESSION AND CONFLICT RESOLUTION STRATEGIES

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The success of a basketball team requires particular aggression from the team members and the selection of suitable conflict resolution strategies. However, these issues remain unanalyzed in female basketball teams.

The research *objected* to reveal aggression and conflict resolution strategies adapted in female basketball teams of different mastery.

The **aim** of the study was to determine links between aggression and conflict resolution strategies adjusted by female basketball players of different mastery.

The following **tasks** were raised:

1. To determine peculiarities and manifestation forms of aggression expressed by female basketball players of different mastery.
2. To reveal the frequency of conflicts which arise in the subjects' teams, and to discover the dominating conflict resolution strategies.
3. To detect links between high-skilled subjects' aggression and conflict resolution strategies.
4. To determine relation between aggression and conflict resolution strategies applied by subjects of low-skills.

Hypothesis

The manifestation forms of aggression and conflict resolution strategies vary between teams of different mastery.

Results:

The study revealed that female basketball players most often use verbal aggression and least – negativism. The indexes of hostility and aggression in both female basketballers' groups are moderate. However, aggression in the high-skilled group is a little higher than moderate. During the investigation of aggression peculiarities possessed by female basketball players of different mastery, no differences were found between the two groups ($p > 0.05$).

It was determined that conflicts are more common in the major league team ($p < 0.05$). There are more frequent cases of disregard for athlete's personality, inane chats, indelicacy, rudeness, authoritarianism and partisan approach towards athlete in the major league team than in A league ($p < 0.05$). The study also revealed that individual and group conflicts are more frequent in the major league team than in A league ($p < 0.05$). The most common conflict resolution strategies possessed by both female basketball groups are compromise and readjustment ($p > 0.05$).

The research established that the more the high-skilled female basketballers are aggressive and hostile, the more frequent they use emulation strategy for the resolution of conflicts and the least often they use compromise strategy ($p < 0.05$). Moreover, the more frequent the high-skilled female basketball players are hostile, the least often they apply readjustment strategy ($p < 0.05$).

It was revealed that the more frequent the low-skilled female basketballers are aggressive and hostile, the more often they use emulation strategy for the resolution of conflicts and the less often they tend to readjust ($p < 0.05$).

THE ANALYSIS OF THE MOST EFFECTIVE TECHNIQUES USED BY SHOTOKAN KARATE JUNIOR FEMALE ATHLETES

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Karate is a harmony of body & soul, thoughts, motion and mind (Funakoshi, 1983; Oyama, 1989; Nakajama, 1994; Ivaskiene, Liaugminas, 2003). There are several karate-do styles and they differ in technique and in general principles of a fight (Ivaskiene, Liaugminas, 2003); therefore, to achieve better sports performance it is important to analyse the effectiveness of every action of karate technique. However, the effectiveness of application arm and leg actions has not been not studied in Lithuania so far.

The **aim** of the research is to analyze the most effective techniques used by Shotokan karate junior female athletes during competition.

Objectives:

1. To determine the actions most frequently and effectively performed during the competitions by Shotokan karate junior female athletes.
2. To determine the most effective techniques actions of the attacks and counterattacks.

The methods used in the research: 1. Literature review. 2. The study of video-recorded data. 3. Stenography. 4. Mathematical statistics.

***Research organisation**:* Members of the team of Lithuanian Shotokan karate junior female athletes whose mastery 4–1 kiu, aged 16–17 (n=10) were studied by analysing the recorded video material from Lithuanian Shotokan karate championships held in 2005—2006. The technique of 10 athletes was analysed. 5 fights of each member were studied and arm and leg technique actions were recorded in a special protocol. The reliability of the effectiveness of technique actions has been calculated with the help of $\chi 2$ index.

Results. Summing up the analysis of technique actions performed by the members of the team of Lithuanian Shotokan karate junior female athletes it can be noticed that arm technique actions ($\chi 2=26.9$; $p<0.001$) were most frequent among Shotokan karate junior female athletes. *Giakucuki* (10.3 percent) of arm actions and *mawasigeri* (8.3 percent) of leg actions prevailed in attacks and counterattacks.

In comparison with studies done by other authors it was noticed that M. Oyama (1989) and N. Nakajama (1994) indicate, that both *giakuci* and *mawasigeri* are very high-scored actions applied during competitions. This was confirmed by the research results.

A comparison of Shotokan karate technique actions chosen by female and male athletes showed that arm actions prevail among both female and male athletes and that the most efficient (for attacks as well as for counterattacks) actions are *giacuki* and *mawasigeri*; the efficiency of this technique is of the same level among female and male athletes, only *mavasigeri* during counterattacks was performed with higher efficiency by female athletes (33.3 percent) than by male athletes (16.6 percent) (Ivaškienė, Liaugminas, 2003).

The research results enable us to give recommendations to coaches how to improve the *giakuci* and *mawasigeri* technique actions as well as versions of their performance. It is important to emphasize that *kizamicuki* and *maegeri* performed during competitions were low-scored; therefore, it is important to focus on the improvement of the technique and tactics.

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STRESS EXPERIENCED BY BOXERS AND BUSHIDO FIGHTERS (PUPILS AND STUDENTS) AND MEASURES OF COPING WITH STRESS

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Athletes experience different stress related to individual values, close and competitive environment, as well as to unexpected circumstances. Yet this field requires more studies. The studies analyzing stress and stress coping measures adapted by boxers and bushido fighters have not been detected.

The object of the research: stress objects experienced by boxers and bushido fighters and measures of coping with stress.

The research *aimed* to determine the stress objects experienced by boxers and bushido fighters (pupils and students) and their measures of coping with stress.

The following *tasks* were raised:

1. To determine and compare stress objects experienced by boxers and bushido fighters and the stress level.
2. To establish and parallel stress coping measures applied by boxers and bushido fighters.
3. To compare stress coping measures applied by subjects, with respect to their age.

Hypotheses:

1) Boxers and bushido fighters mostly experience stress which is connected to training.
2) Bushido fighters experience less stress.
3) Students apply more measures of coping with stress than pupils.

Method: analysis of references, questionnaire, statistical analysis. An anonymous questionnaire survey was carried out at sports clubs x, y and z in Kaunas city during the autumn of year 2010. The survey was executed after workout. Filling in the questionnaires took 15–20 minutes in the presence of the investigator. The group of subjects was selected using target selection. The research analyzed 117 respondents (55 boxers and 62 bushido fighters). Their age varied from 15 to 30 years. The respondents were classified according to two criteria: sort of sports and training status (pupils and students).

The results of the study were statistically analyzed using software *SPSS 17.0* package. For the comparison of different group results the research used *Spearman correlation coefficient.*

It was found that: Boxers and bushido fighters tend to experience stress which is caused by training. Stress level is moderate. Despite the attended sort of sport, organism, intelligence, the experienced social stress is of moderate or low level. The stress which is caused by work is mainly low.

Boxers usually plain to their family members, use self pity, cry, blame their selves, complain to their friends, use alcohol, as the measures of coping with stress. However, bushido fighters listen to music and communicate after experiencing stress ($p<0,05$).

After stressful situations pupils watch movies, communicate, and maintain the sense of humor. However, students smoke tobacco, use self pity, alcohol, complain to friends, spend their time with a lover and do additional training.

THE ROLE OF LIFE-LONG EDUCATION IN SPORTS COACH PROFESSIONAL DEVELOPMENT

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Life-long learning is education in the whole life span of human being, based on inner necessity or external causes, with an aim to obtain and enrich knowledge and skills. Life-long education has become the main instrument in increasing human competitiveness, the cause of which is extraordinary rapid emerging and dissemination of new knowledge (Mūžizglītības politikas pamatnostādnes 2007-2013 [Guidelines for Lifelong Learning Policy 2007-2013]).

Aim of the study: raise sports coach awareness about main benefits of life-long learning in coach professional development.

Subjects and methods: in the research participated 191 sports coach. The subjects were from different districts of Latvia (Liepāja, Saldus, Valmiera, Limbaži, Rēzekne, Ludza and Rīga).

Data collection: in the research was administered a questionnaire (Cronbach alpha of the scale α =.81).

Data processing: for data processing was used mathematical statistics. Quantitative data were analyzed with the method of factor analysis. 13 items of the questionnaire comprise main benefits of coach life-long learning. Using methodology, developed by Lasmanis, Kangro, and Pallant (Lasmanis & Kangro 2004; Pallant, 2007) first was tested the suitability of data for carrying out factor analysis with the help of Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett Test of Sphericity. Further was carried our Principal Component Analysis and Oblimin rotation.

Results: 13 items of Main benefits of life-long learning scale were subjected to Principal Components Analysis (PCA) using SPSS Version 15. Prior to performing PCA, the suitability of data for factor analysis was assessed. Inspection of correlation matrix revealed the presence of many coefficients of .3 and above. The Kaiser-Meyer-Olkin value was .82, exceeding the recommended value of .6, and Bartlett Test reached statistical significance ($p<.05$). Principal Components Analysis revealed the presence of four components with eigenvalues exceeding 1, explaining 31.028%, 9.706%, 8.902% and 7.819% of the variance respectively. The four component solution explained a total of 57.456% of the variance.

Main components of lifelong learning benefits scale are the following:

Factor 1: ability to influence society – helps to change society attitude to important issues, for example, sport; strengthens generation bonds; help better inclusion in international labor market.

Factor 2: professional competence – develops professional competence, increases understanding and promotes personal attitude to happenings in the society; specialist obtains useful information; the obtained knowledge raises self-esteem and enhances entrepreneurship.

Factor 3: creative competences - raise awareness about latest tendencies in sport education; improve creative methods.

Factor 4: physical and mental development – strengthens health (mental, physical and emotional), improves physical and mental development, improves and develops value system.

All four factors show positive correlations, this fact means that all of them are important in life-long education and they enrich one another.

Conclusions and discussion:

The analysis of scientific literature has shown that Preston and Hammond (Preston & Hammond, 2002), investigating the role of lifelong learning, distinguish four factors: "psychological health", "self-efficacy"; "community" and "citizenship".

According to the results of our research, the most important factors in lifelong education are following: "ability to influence society", "professional competence", "creative competences", "physical and mental development".

Characterizing the opportunities of lifelong learning, can be concluded that during the process of lifelong learning the coaches obtain knowledge, which raises their self-esteem, enhances entrepreneurship, promoting their competitiveness in an international environment, as well as improves their physical and mental development and creative professional competence.

The opportunities of sport coach lifelong learning education should be widened through the formation of flexible lifelong learning environment, which activates the improvement of coach professional skills in particular kind of sport and the their psychological health.

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CHARACTERISTICS OF YOUNG LEARNERS' PSYCHOLOGICAL WELL-BEING AND SELF-ESTEEM IN PHYSICAL EDUCATION LESSONS

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Introduction: According to the research data of Overholser I. C., Nasser E. H. (2000), the learners experience stress and anxiety at school because of bullying, and routine stressors are undergone as dangerous ones. Therefore, they even do not want to go to school. Hall, A. S. Torres, I. (2002) point out that the learners estimating themselves as funny and happy ones tend to unadaptive behaviour and the learners with low self-esteem are characterized by a disadaptive avoidance style more often than the learners with an average self-esteem (Natvig, Albrektsen, Anderssen, Qvarnstrom, 1999). However, few researches analyzing young learners' self-esteem and psychological well-being in physical education lessons have been carried out in Lithuania. **The aim of the research** is to analyze young learners' self-esteem and psychological well-being in physical education classes.

Research organization. Young learners' self-esteem and psychological well-being in physical education lessons has been analyzed in Klaipeda City schools using an anonymous survey questionnaire method. 250 questionnaires were distributed to the respondents and they were explained how to fill them in. 222 respondents answered the survey questions. The research of young learners' psychological well-being in physical education lessons was carried out using the assessment scale based on D. Beresnevičienė (1995) psychological well-being profiles. A semantic differential scale modified according to the respondents' age was used to carry out a research on learners' psychological self-esteem in physical education lessons. The scale was formed on the basis of A. Suslavičius (1988) semantic differential method.

Results. Analysis of young learners' psychological well-being in physical education lessons showed that although the majority (64.0%) of young learners liked attending physical education lessons where they felt well (47.7%), the lessons were easy (45, 5%), very interesting (52.3%), they were very happy (45.0%), and physical education lessons were useful to them (53.6%), but the learners felt insecure in physical education lessons because they suffered from bullying and aggression from other learners in the class. Young learners did not inform parents and teachers about the grievances experienced in physical education lessons. They used to talk about it with friends. There have been cases when the learners did not want to attend school because of other learner's bullying and aggression in physical education lessons ($p < 0.01$). Summarizing the research results of learners' psychological well-being, it can be noted that psychological well-being of 41.0% of learners in physical education lessons was good or very good. Although the majority of learners liked attending physical education lessons, the remaining number of learners did not feel happy in physical education lessons because of other learners' bullying ($p < 0.01$). Analysis of the results of young learners' self-esteem in physical education lessons showed that

41.0% of learners estimated themselves as average ones. 56.8% of learners considered themselves to be unfriendly. As revealed later, the learners who considered themselves as unfriendly ones had been bullying other learners in class ($p < 0.01$), they were pushing, kicking, calling names and teasing other learners ($p < 0.01$). Bullying and aggression affected other learners' psyche and enhanced the feeling of stress. However, a successful overcoming of stress helped learners gain positive experience, and stimulated the growth of their self-esteem, because learners estimating themselves as being calm in physical education lessons felt safe ($p < 0.05$). In case of abuse in physical education lessons, they usually used to defend themselves from abusers. However, learners estimating themselves as friendly, strong, beautiful, smart, funny, happy and talented ($p < 0.01$) did not feel safe in physical education lessons because they were afraid of failure and bullying from other learners in the class. Given these results it can be stated that there is a problem of mutual understanding and tolerance in physical education lessons. Therefore, it is necessary to develop learners' humanity and mutual understanding in physical education lessons, so that all learners wanted to attend physical education lessons, and felt happy there. The research showed that the majority liked attending physical education lessons and they felt happy if other learners were not bullying them and were helping in case of failure.

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ACTION OF PROGNOSTICATION CREATING THE FUTURE OF A BUSINESS ORGANIZATION

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Introduction: Accordingly to intensive competition in the market of tourism organization the author of this article turn tourism organizations attention to general aspects of business organizations' development relatively with new management theories managing organizations. According to J. Kvedaravicius (2006) the next perception of the human world might be orientated to process-action. That is the reason why it is important to analyze and understand separately and together processes and actions which make influence to management and development of an organization. These processes could not be separated from inside opportunities of an organization that create competitive advantage. This is one of the ways to play a winning game and expand business in the market.

Creating the future of an organization M. Rac (Рац, 1993) distinguished basic actions: prognostication, floodlighting, projecting, programming, planning, scenario making, project implementation, author supervision, expertise, monitoring, organization, and management. In this article the author pursue to educe the role of prognostication action in an organization. The future of an organization could be prognosticated using financial results, analyses of an organization outside and inside environment and even guess using an intuition. On the other hand an organization is socio-cultural system and its active subject is human who might behave contrarily from made prognostications. This is one of the reasons why to predict the future of an organization is sufficiently difficult process and employment of the common methods could be ineffective. According to said the problem of this article is formulated: how action of prognostication in an organization is related to its creation of the future and its development. The object is action of prognostication. The **aim** of this article is according to empirical research validate the relation between action of prognostication and development of a business organization.

Methods. This article is equipped with these methods: analyses of literature and questionnaire interview. Quantitative research is made confidently questioning the executives of business organizations. In the process of the quantitative research, 113 filled in questionnaires were collected with the required coverage of 96. The methods employed in result analysis were descriptive statistic analyses, correlation analyses and factorial analyses.

Results. Analyses of scientific literature revealed that qualitative prognostication is the result of considered strategic analyses. According to Дж. Баркер (2007) strategic analyses include five factors: perception of influential facts, divergent and convergent thinking, creation of map or scheme and portrayal. The author of this article believe that the mind activity of the manager include all five factors of strategic analyses that could be used creating the future of an organizations. This is how the process of an

organization development is created. Correlations allow determining the fact that prognostication includes such mind activity factors as pure thinking, intuition, understanding/ communication, reflection and awareness. Rational thinking, in the respondents opinion, is not identified as a necessary mind activity in prognostication, thus the applicability and development opportunities of this factor should be assessed when creating organization future models.

Discussion. In general relating propositions of the prognostication with elements of the mind activity there could be noticed that the prognostication is related with the intuitive thinking, the absolute thinking, the perception and the communication, the reflection and the awareness. On the other hand the prognostication is not related directly with the mind activity. According to relations between elements of development and analyses of prognostication's methods there could be stated that selves-developing organizations recognize importance of intuitive thinking developing organization. At the same time these organizations specially pay their attention to the most important ways of thinking which increase reliability prognosticating the future of an organization.

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THE ANALYSIS OF JOINT POSITION SENCE ALTERATION DURING FIRST 13 WEEKS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Research background. JPS (joint position sense) is important in the prevention of injuries as reduced proprioreception is one of factors; contributing to injury in the knee joint, particularly the ACL (anterior cruciate ligament). Therefore, proprioception appears not only important for the preventio of ACL injuries, but also for regaining full function after ACL reconstruction. We found in articles by other authors, who measured the JPS after 6 and 12 months of surgery (Angoules et al., 2011). We noticed, that is the lack of data on JPS changes during the first months after ACL reconstruction.

Research aim. The aims of this study was to understand how JPS are changing during first thirteen weeks after ACL reconstruction.

Research methods. The study included 15 male (age = 33.7 ± 2.49 years) who had undergone unilateral ACL reconstruction with a semitendinosus/gracilis (STG) graft in Kaunas Clinical hospital. JPS was measured on both legs using an isokinetic dynamometer (Biodex), at knee flexion of 60°, 70°, and in different knee angular velocities 2°/sec. and 10°/sec. The patients were assessed preoperatively and at 5, 9 and 13 weeks, postoperatively. We used SPSS and Excel for all statistical analyses.

Research results. The results of this study indicated, that there was a significant difference ($p < 0.001$) between the injured and the healthy legs before surgery and at after 5, 9 and 13 weeks of surgery. Both the knee tests extension and flexion data showed that there was JPS‘s error scores higher on the injured knee compared with the noninjured knee. After 5, 9 and 13 weeks of surgery we found significantly lower ($p < 0.05$) values in injured knees compared with the preoperative data. On the both legs were measured significant differences ($p < 0.05$) between two different angular velocities 2°/sec. and 10°/sec. It schould be noted, that the mean active angle reproduction errors at the test of angular velocity 2°/sec. was highest compared with the angular velocity 10°/sec.

Discussion and conclusions. Our study has shown that the JPS‘s error scores to a controlled acctive movement is significantly higher in injured ACL-deficient knee than in the contralateral knee (normal knee) before surgery and at after 5, 9 and 13 weeks of surgery. Before surgery we found that there were higher difference for JPS‘s erros scores between in injured ACL-deficient knee than in the contralateral knee (normal knee). Significant data have come to light demonstrating JPS differences between normal and injured knees, and often between injured and reconstructed knees (Dhillon et al., 2011). After 5, 9 and 13 weeks of surgery we found significantly lower values for JPS‘s erros scores in injured knees compared with the preoperative data. Some studies concluded that JPS might be restored to an equal level compared to the uninjured contralateral limb or controls (Karasel et al., 2010). Our study

has shown that in injured knee active angle reproduction errors after 13 weeks of surgery were significantly higher compared with noninjured knee. In this study, we analysed failure of JPS at each of the two different angular velocities used. It is usually performed at slow speeds. Reproduction active position (RAP) stimulates both joint and muscle receptors and provides a more functional assessment of the afferent pathways (Lephart and Fu, 1998). Our study has shown that on the both legs were measured significant differences between two different angular velocities 2°/sec. and 10°/sec. It schould be noted, that the mean active angle reproduction errors at the test of angular velocity 2°/sec. was highest compared with the angular velocity 10°/sec. Two explanations may account for this: 1) separated populations of mechanoreceptors in the ACL are stimulated at different rates of extension of the knee, providing different proprioceptive information; or 2) periarticular receptors (including muscle splindles) may be selectively activated at higher speeds (Wright et al., 1995).

In conclusion, our study shows that there was improvement in mean JPS 13 weeks after ACL reconstruction, but it was not returned to normal. The JPS‘s error scores to a controlled acctive movement is significantly higher in injured ACL-deficient knee than in the contralateral knee (normal knee) before surgery and at after 5, 9 and 13 weeks of ACL reconstruction. The knee JPS on the both legs depends upon the rate at between two different angular velocities and the mean active angle reproduction errors at the test of angular velocity slow speed was highest compared with the fast angular velocity.

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SPECIFITY OF MUSCLE CELL REGENERATION IN MYOTOXIN-CAUSED DAMAGE

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Introduction. One of the basics of adaptation of skeletal muscle tissue is ability to regenerate after degeneration, whereas the dynamics and degree of regeneration depend on the origin of degeneration. In post-mitotic tissues, damaged cells are not replaced by new cells and hence effective local tissue repair mechanisms are required. In skeletal muscle, which is a syncytium, additional nuclei are obtained from muscle satellite cells that multiply and then fuse with the damaged fibres. When muscle fibres sustain damage they have to obtain extra nuclei for the repair process reasonably quickly, to avoid cell death, which would result in a decrease in muscle mass and a permanent functional deficit.

It is known that local anesthetics cause extensive damage that is largely specific to muscle fibers, without causing damage to the basal lamina, blood vessels, or the regenerative capabilities of satellite cells. Consequently, muscle fiber regeneration can be studied unhindered, without the competing complications of ischemia and fibrosis commonly observed with other models of experimental muscle injury.

Aim: The present study was undertaken in order to investigate the skeletal muscle fibre-type specifity of regenerative response after muscle damage caused by bupivacaine injection.

Methods: Adult Wistar rats were used in the study. Muscle damage was caused by 0,5% bupivacaine injection. Muscle samples were analyzed histologically and electrophoretically to clarify dynamics of regenerative changes of tissue structures and protein synthesis.

Results: After intramuscular myotoxin injection rapid and well-pronounced damage of affected muscles were detected. By our data almost complete regeneration of damage muscle tissue lasted 2-3 weeks. Our data showed that during regenerative processes the qualitative remodeling of skeletal muscle tissue takes place, whereas expression of slow-type of muscle fibres was more pronounced. Overexpression of slow isoforms of myofibrillar proteins in muscle homogenate were in accordance with changes detected in histological level.

In conclusion: in conditions, where regenerative potential of skeletal muscle cells is not affected by destructive mechanisms, well-pronounced and almost complete rebuilding of muscle tissue occurs with the direction of overexpression of slow-type muscle proteins.

RELIABILITY AND VALIDITY OF THE LITHUANIAN VERSION OF THE INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

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Introduction. Physical inactivity is a global health concern that causes more than two million deaths each year making it one of the top 10 leading causes of death and disability [1]. Physical activity of the Lithuanian population has been generally analysed as a component of the human behaviour, therefore, these results are difficult to compare with the findings from population-wide studies in other countries where internationally used instruments like the International Physical Activity Questionnaire (IPAQ) are used [2]. The results from a pilot study using the Lithuanian version of the IPAQ confirmed the assumption that the IPAQ questionnaires can be used in wider studies [2]. Seeking to determine the validity and reliability of the IPAQ questionnaire, it was necessary to examine the respondent's physical activity simultaneously using objective and subjective measures.

Methods. Subjects of the study were 92 persons aged 18-69 (29 male and 63 female). Physical activity of the participants was measured with the accelerometer ActiGraph GT3X Actilife and reported by the Lithuanian short and long self-administered versions of the IPAQ. The subjects had to wear the accelerometer on their waist for 7 consecutive days, except when sleeping or bathing. After 7 days the accelerometers were collected and the data was loaded into a computer. Each subject filled out the IPAQ after the same 7 days and repeatedly filled out the IPAQ after the next 7 days. The data was processed with the SPSS Statistics 17.0 software. The correlation between the short and long versions of the IPAQ with the accelerometer data was measured using the Pearson and Spearman correlation. The accepted level of significance was $p<0.05$.

Results. The analysis of the data from the short and long IPAQ versions shows that moderate correlation exists between the test and retest data of the long and short IPAQ, according to Spearman's rank correlation coefficients 0.748 and 0.659 respectively.

The analysis of the accelerometer data for 7 consecutive days and the test and retest data of the long version of the IPAQ shows that negligible correlation exists between the accelerometer data and the first test ($p = 0.104$, $r = 0.171$) and weak correlation is noticed between the accelerometer data and the second test ($p = 0.33$, $r = 0.223$).

The analysis of the accelerometer data for 7 consecutive days and the test and retest data of the short version of the IPAQ shows that weak correlation exists between the accelerometer data and the first test ($p = 0.009$, $r = 0.270$) and negligible correlation between the accelerometer data and the retest ($p = 0.591$, $r = 0.057$).

To conclude, the test and retest data about the subjects' physical activity obtained from the long and short versions of the IPAQ correlates between each other and with the accelerometer data.

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DETERMINING THE CORRELATION BETWEEN SUBJECTIVE AND OBJECTIVE PHYSICAL ACTIVITY MEASUREMENT INSTRUMENTS

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Introduction. Physical activity (PA) of the Lithuanian population most often has been studies as an integral part of the wider study of human behaviour (1). In this respect is it important to determine the correlation between subjective and objective research instruments used for the PA assessment of (2).

Methods. The current study included 92 subjects aged 18-69 out of whom were 63 female and 29 male subjects The subjects' level of PA during a week was measured using the accelerometer ActiGraph GT3X Actilife and reported by the subjects. The subjects wore the accelerometer on their waist for 7 consecutive days, except when sleeping or bathing. After the period of 7 days the accelerometers were collected and the data was loaded into a computer. Then the subjects were asked to evaluate their level of PA subjectively attributing match it to 3 levels: low, moderate and vigorous. The data was processed with the SPSS Statistics 17.0 software. The correlation between the subjective and objective data was measured using the Pearson correlation with the accepted level of significance $p<0.05$.

Results. The study shows that 28.3 % of the respondents reported that their PA level is low, 53.3 % of them considered their PA level to be moderate and 18.5 % indicated their PA level as vigorous. According to the accelerometer data, low level of PA was determined in 20.7 %, moderate level in 78.3% and vigorous in 1.1 % of the subjects. Significant difference ($p<0.05$) between subjective and objective data was observed in all levels of PA.

Discussion. In conclusion, the results from the study suggest that the self-reported assessment of the subjects using the scale of three levels for the intensity of PA significantly differs from the objective PA assessment using the accelerometer and, for this reason, such subjective measurement tools should not be applied in the studies related to PA.

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THE THRESHOLD FOR FLEXIBILITY ENHANCEMENT IN SCHOOLCHILDREN

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Introduction. Flexibility has been defined as the ability of muscles to lengthen and allow joints to move through a range of motion (Zachezewski, 1989). The effect of different variables linked with stretching, such as force or intensity (Walter et al., 1996), position (Sullivan et al., 1992), frequency, duration (Bandy et al., 1997, Marques et al, 2009) has been studied previously. However, the smallest stretching amount necessary to provide long lasting adaptation has not been well defined. Such clear definitions are essential for physical education teachers who usually have a very limited time to improve schoolchildrens' physical abilities. School-age youth generally have 2 physical education (PE) lessons per week for 45 minutes in Lithuania. In such short time physical education teachers must employ techniques and exercises to develop youths' physical skills and overall fitness. Therefore, the main **aim** of the study was to establish the threshold of training load volume for flexibility enhancement using static stretching techniques during physical education lessons in schoolchildren.

Methods. Subjects were 239 tenth grade children randomly assigned to four groups (boys 107, girls 132, mean age 15.1 ± 0.4). Schoolchildren involved in after—school sports were not included in the study. Physical education lessons were performed twice a week for 45 minutes in duration. The intervention lasted for 5 weeks comprising 10 physical education lessons. Flexibility was determined from sit and reach test before and after intervention. Subjects in group 1 (OT) performed standard "sit and reach" test of four trials in every physical education lesson; in group 2 (1 x 4) received one stretching exercise of four repetitions; group 3 (4 x 4) received four stretching exercises of four repetitions; in group 4 no stretching was performed.

The results. There were no significant differences in age, height, weight and fat percentage among all 4 groups ($P > 0.05$, for all parameters, effect size (ES) = 0.01–0.34) prior to flexibility assessment. Boys were taller and weighed more than girls, while girls had significantly greater fat percentage ($P<0.05$, for all parameters, ES = 0.61–1.76). Anthropometric data did not correlate with sit and reach test results markedly (r ranged from 0.25 to – 0.32). There were no significant differences in sit and reach test scores among the groups at pre measurements ($P>0.05$, ES = 0.03–0.22). Though, girls scored higher than boys in each group ($P<0.05$, ES = 0.53–1.09). The two-way ANOVA indicated a significant interaction between the group (control, OT, 1 X 4 and 4 x 4) and time (pre and post) in sit and reach test scores ($P<0.05$). Flexibility improvement in group 4 x 4 were the greatest (21.6%, $P<0.05$, ES = 0.71), smaller in group 1 x 4 (12.6%, $P<0.05$, ES = 0.48) and smallest in OT group (5.1%, $P<0.05$, ES = 0.21), while control group changes were insignificant ($P>0.05$, ES = 0.05).

The main finding was that small amounts of stretching experienced during "sit and reach" test repeated at every physical education lesson was sufficient stimulus to increase low back and hamstring

flexibility in high school schoolchildren not engaged in sports. However, the rule of “more is better’ was confirmed because larger improvement was found in subjects exposed to greater stretching volume. We assume that the observed improvement in joint range of motion is associated with an altered stretch tolerance rather than other causes in OT group. The subjects were more acceptable to uncomfortable stretch sensations at post compared to pre ROM measurements. The results suggest that stretching exercises provides exceptional prospects to achieve youths’ improvement since flexibility is very sensitive to training. From a practical perspective, the low threshold for flexibility enhancement allows the teacher use stretching exercises as a powerful tool to achieve physical education goals.

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MORPHO FUNCTIONAL INDEXES AND HEALTH OF THE THIRD YEAR STUDENTS TAKING ACTIVE PART IN SPORTS ACTIVITIES AND STUDENTS DO NOT TAKING ACTIVE PART IN SPORTS ACTIVITIES

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Introduction. Physical potential depends on physical development, health. Physical potential of physically active people increase, meanwhile blood pressure, blood lipids reduce (Ortlepp, Metrikat, Albrecht and Maya – Pelzer, 2004). Physical activity skills formed in an early age decrease the risks of chronic diseases such as: obesity, hypertension. However, most of the research works prove that healthy people of different ages are not active enough. Previous researches showed that morpho functional indexes, health of students who are actively involved in sports depend on the sports event they are involved in, trainings and competitions loads (Skirius, Karpavičienė, 2003). Literature resources refer that school learners and students height, body mass, body build increase and power indexes reduce (Negasheva, Mishkova, 2005; Ma, Wu, Zhou, Yang, Tsren, He, Ye, 2009). Other authors argue that students physical development indexes are up to the standards (Astrauskienė, Šapokienė, Jansonienė, Bajorienė, 2010).

The aim of this research is to estimate morpho functional indexes and health of the third year students taking active part in sports and students do not taking active part in sports activities.

The organization and methods of the research. The research was performed in Kaunas Sports Medicine Center of Lithuanian Academy of Physical Education in Sports Medicine Department and Lithuanian Academy of Physical Education Room in the years 2009 and 2011. 28 students of Sports Biomedicine Faculty and 26 students of Sports Education Faculty participated. Morphofunctional indexes were estimated measuring height, body mass, round the chest with maximum breath in and breath out and in a still position. Body mass, Brugshow, Pinie indexes were calculated (Skirius, 2007). Functional state was researched measuring vital lungs capacity, arms muscle strength. Spirometry and dynamometry indexes were calculated (Skirius, 2007). Students' health was assessed in accordance to the data of Sports Medicine Department of Lithuanian Academy of Physical Education. The differences in data were evaluated on the basis of Stjudent's distributions (Gonestas, Strielčiūnas, 2003).

Research results and their discussion. Morphological research established that the height of students who are not actively involved in sports is 182.7 ± 6.7, body mass – 81.6 ± 12.4, body mass index – 24.4 ± 3. Chest is developed very well (Brugsh index – 52.8 ± 3.2). Body structure is of hypersthenes type (Pinje index – 7.4). Spiro metrics (54.8 ± 10) and dinamo metrics (48.6 ± 10) indexes are lower than standard. The height of students actively involved in sports is 184.9 ± 6.9, body mass – 86.2 ± 10.5, body mass index – 25.2 ± 2.7, Brugsh index – 55.6 ± 3.7. Body structure is of hypersthenes type (Pinje index – 0.9). Spiro metrics (59.1 ± 9.1) and dinamo metrics (51.7 ± 7.8) indexes are lower than standard.

Comparing morpho functional indexes of students actively involved in sports with the functional indexes of students who are not actively involved in sports, it becomes evident that height, body mass, lungs capacity, hand muscles strength, body mass and Pinje indexes are similar ($p>0.05$), chest development indexes are reliably greater ($p< 0.05$). 53.6 % of students do not taking active part in sports and 76.9 % of students taking active part in sports applied to Sports Medicine Department of Lithuanian Academy of Physical Education. In health disorders structure, diseases composed 91.7 %, traumas – 8.3 % of all cases. For students taking part in active sports accordingly, diseases composed 44.2 %, traumas – 55.8 % of all cases. Researching disease distribution, it was established that heart and vascular diseases (45.8 %) and respiratory track diseases (41.7 %) were more frequent among the students who are not actively involved in sports. Researching the structure of traumas for students involved in sports, it was established that such students suffer more often of sprains (62.5 %) and bruises (25 %).

Conclusions. Chest development indexes are greater for students involved in sports than those of students who do not take active part in sports. Students who do not take active part in sports more often suffer from various diseases than from traumas, while students taking part in sports have traumas more often.

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EVALUATION OF YOUNG ATHLETES' LUNG FUNCTION

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Introduction. The most important factor in aerobic capacity is the respiratory system. It is known that the respiratory functional capacity often limits the inner breath, but overcoming extreme physical loads or under pathological conditions external respiratory system can determined human's physical work capacity and health (Andziulis et al., 2002). Oxygen consumption in organism depends not only on the cardiovascular system, but on the respiratory system also: vital capacity (VC), forced vital capacity (FVC), forced expiratory volume and speed, etc. Data in the literature show that during the training process athletes increase their VO2, but the lung function adaptation level to physical loads is much lower compared to muscle and cardiovascular system adaptation level **(**Dempsey, Johnson, 1992). During maturation period, when the volume of the body and the body's metabolic rate in children is increasing, the functional respiratory parameters of sporting children are changing faster comparing to nonathletic. It was noticed that these changes in lung function parameters depends on the sports (Jansen, 2007; Andersen 2006). Increasing of aerobic capacity is a main health' component during the maturation, but also is a factor for further development of children practicing sport. **The aim** of the research was to evaluate lungs functional indices of young athletes' at rest and to compare these functional indices of athletes', engaged in different sports.

Methods. Research sample included young athletes (age 12.4±0.47). They were divided in three groups, according their sport: triathlonists (n-12), football players (n-15), and tennis players (n- 9). Their experience in sports of these athletes' was 3.1±0.41 years. There was collected anthropometrical data, and lungs function test carried out using spirometre, applying SpidaXpert programme for body rest conditions, measuring forced vital capacity in litres (FVC), forced expiratory volume in one second in litres (FEV1), peak expiratory flow (PEF l/s), forced exhalation ratio – Tiffneu index (FEV1/FVC), forced vital capacity after exhalation 75-25 % FVC (FEF75, FEF 50, FEF25). It was used the rythmography method also, to evaluate athletes' functional state, Rufje index. Data was processed using method of mathematical statistics, statistical difference between means significance evaluated applying Student criterion, and its significance level $p<0,05$.

The results of our research show the differences in lung function, depending on sports. Football players lung function indices were: VC– 3.56±0.14 l ; FEV1– 2.9±0.11 l; FVC– 3.28 ± 0.31 l; PEF – 5.64±0.61 l/s, in tennis players these indices various respectively: VC – 3.25±0.33 l, FEV1- 2.68 ±0.11 l, FVC–3.20±0.24 l, PEF–5.69±0.21 l/s. Comparing lung function indices of football players and tennis players with triathlonints lung function parameters, we found that triathlonists VC, FEV1, FVC and PEF were statistically higher. These data demonstrate that lung function could be caused by the

physical loads, which in triathlonists training process were dominating. Literature data shows that expiratory flow may be influenced by BMI. In our research the BMI differs from 18.4 to 20.5.

Conclusions. Results of lung function at rest depend on the gauge of developing aerobic potential during the training process. It can be stated that young athletes may improve their lung function parameters on the effect of aerobic loads, which were often applied in triathletes preparation program. The aerobic capacity development of young athletes during training enhances their resistance to fatigue, promotes a faster recovery.

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ANTERIOR CRUCIATE LIGAMENT RUPTURE: STATIC VS DYNAMIC BALANCE TESTING

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Introduction. Knee anterior cruciate ligament (ACL) is one of the most often injured knee anatomical structure. After ACL rupture decreased neuromuscular and sensorimotor system control as well as muscle activation and muscle strength affects body imbalance and increased variability of muscle torque (Bonsfills et al., 2008; Ingersol et al., 2008). There is no close relationship between static and dynamic body balance. Ability to maintain good static body balance does not mean the ability to maintain dynamic body balance. There are few studies about body balance alteration after ACL, but research results are controversial. Some authors (Mituza et al., 1992; Alonso et al., 2009) have found that after ACL, body sway is higher on injured leg compared to non-injured leg. But the other (Harrison et al., 1994) have found that ACL rupture does not affect the body balance.

Our primary **aim** was to determine the static and dynamic balance changes before ACL surgery and after rehabilitation. Goals of the study: 1) to investigate and to compare static balance before ACL surgery and after rehabilitation; 2) to investigate and to compare dynamic balance before ACL surgery and after rehabilitation.

Methods. Ten untrained male participated in this study after ACL rupture (mean ± SD, age 28.4 ± 8.1 years, height – 179.8 ± 8.5 cm, weight – 76.0 ± 14.0 kg). The study was performed in the Lithuanian Academy of Physical Education in the Sports and Movements Science Centre. All subjects where tested before ACL surgery and after 3 months of rehabilitation. Two weeks after the surgery the following rehabilitation was applied: physiotherapy, massage and physiotherapy in the water (3 times per week, 16 times in total). Following these procedures rehabilitation was continued with muscles strength training exercises in a gym.

Balance was measured when participant stood on a KISTLER balance platform with open eyes, looking directly into the selected point 2 m away at the eye level, hands on hips. Balance within 20 s while standing on one leg and balance within 15 s after one leg hop for both healthy and ACL ruptured legs were measured.

The **results** showed that standing on ACL ruptured leg before surgery and after rehabilitation the oscillations were not significantly different, but standing on the healthy leg after rehabilitation significantly improved. Test results after one leg hop on ACL ruptured leg showed that oscillations were significantly greater after rehabilitation.

Conclusions: 1. After rehabilitation one leg static balance improved only in non-injured leg. 2. After rehabilitation one leg dynamic balance decreased in injured leg, but increased in non-injured leg.

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RELATIONSHIP BETWEEN ADOLESCENTS' SPORT ACTIVITIES, TOBACCO AND ALKOHOL CONSUMPTION, AGGRESSION, SELF-ESTEEM AND THEIR GENDER

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Introduction. Socialization can take place through participation in sports since sports provide learning environments where participants have the opportunity to learn competition, cooperation, role-playing and discipline regarding rules, regulations, and goals (Bloom & Smith, 1996). In this sense, sports can be seen as a laboratory of human experience. The structure of social relations in organized sports can give participants experience in various roles and group interaction, and contribute to the development of social characteristics that integrate them into existing larger social structure. **The aim** of our study was to determine the relationship between adolescents' self-esteem, aggression and smoking and alcohol consumption, gender and sport activities.

Research methods. Teenage boys (N=373) and teenage girls (N=236), whose average age (SD) made 14.58 (1.53) years old participated in the research. The questionnaire based on RSE (the Rosenberg Self-Esteem Scale (1965)), AQ (Aggression Questionnaire (Buss & Perry, 1992; Buss & Warren, 2000)), HBSC scales. The data were analyzed using SPSS for *Windows 13.0* (*Statistical Package for Social Science 13 for Windows*). Spearman's rank correlation coefficient was used in the relationship between variables. The results were considered statistically significant if $p < 0.05$.

Results. Statistically highly reliable relations ($p<0.01$) of medium strength were determined among all the types of aggression: physical and verbal aggression (r=0.51), physical aggression and anger (r=0.61), physical aggression and hostility (r=0.45), verbal aggression and anger (r=0.58), verbal aggression and hostility (r=0.44), and anger and hostility (r=0.62). Another medium strength highly reliable relationship was determined between the frequency of alcohol drinking that reached the level of intoxication and smoking frequency (r=0.45). Alcohol intoxication was on the average related with the frequency of weak alcoholic drinks usage, such as Fizz, etc. (r=0.41), stronger drinks, such as beer (r=0.66), and strong beverages, such as vodka (r=0.61). Insignificant relations were distinguished between a number of factors: smoking and beer (r=0.34), champagne (r=0.27), weak alcoholic drinks (r=0.33) and vodka (r=0.35) drinking frequency. Not particularly strong correlations were found between smoking and physical (r=0.217) as well as verbal (r=0.219) aggression. It is worth stressing that self-esteem was inconsiderably negatively related only with hostility (r=-0.307). The analysis of the relations between aggression and gender revealed an inconsiderable relation between physical aggression and male gender (r=0.284).

Discussion and conclusions. The medium strength relations were determined between all the types of aggression. The usage of different kinds of alcohol was also on the average interrelated. Peretti-Watel (2003) found that girls competing at international level were more likely to smoke cigarettes. In our

analyzed sample, the statistically reliable relations between the adolescents' gender, smoking habits and sport achievement were not determined. Martens, Dams- O`Connor, Beck (2006) found that individuals that participated on sports teams were correlated with the higher rates of alcohol use. We were found not particularly strong correlations (r= 0.25 – 0.31) between sport achievements and alcohol intoxication and beer, wine and vodka drinking frequency.

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COLLABORATION DIRECTED LEARNING APPROACH FOR STUDENTS WITH SEVERE AND MODERATE DISABILITIES IN INCLUSIVE PHYSICAL EDUCATION

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Introduction. Collaboration directed learning approach is when students support each other rather than rely on teacher or paraprofessional (e.g., physiotherapist) assistance. Utilizing peers as a natural support in physical education can facilitate interactions between students with and without disabilities while also providing individualized teaching instructions (Klavina & Block, 2008; Slininger, Sherrill, & Jankowski, 2000). This presentation **aims** to demonstrate cooperation directed learning of peer tutoring for elementary students with severe disabilities and moderate disabilities in inclusive physical education setting.

This **research** project was extension of two replicated international studies implemented in four elementary schools. First study involved three students with severe disabilities, while second study included four students with mild disabilities. A single subject multiple baseline design across participants was used in both studies. Several classmates without disabilities were selected as age appropriate peer tutors for all students with disabilities. The peer tutor training program incorporating teaching instructions, physical assistance, feedback, and communication skills served as the independent measure. Dependent measures included the physical, instructional and social interactions between students with and without disabilities. Computerized Evaluation Protocol of Interactions in Physical Education (CEPI-PE) (Klavina, 2011) was used determine the effect of peer tutoring on multi-component behavioral interactions. All study sessions were video-recorded, coded and analyzed. The peer tutoring intervention followed baseline sessions.

For the three students with severe disabilities during baseline conditions students with severe disabilities presented significantly higher level of interactions with adults than with peers (42.5% and 13.6 %, accordingly), while for the four students with moderate disabilities the percentage of interactions with the teacher and peers did not have significant difference (9.9% and 12.2%, accordingly). The presence of peer tutors during intervention conditions had positive effects on increase of interaction behaviors between students with severe disabilities and peer tutors (36.9%), and other classmates (24.8%). However, most of interactions were *instructional* when peer tutors provided prompts, cues or feedback to their tutees, or *physical* when the student with disabilities worked on PE activity together with their classmates. Social interactions remained low throughout the study (4.5%). During intervention interactions between students with moderate disabilities and peer tutors slightly increased (3.2% baseline, 11.8% intervention). The interactions with other peers slightly decreased (from 9.0% to 6.8%). Students with moderate disabilities maintained high percentage of activities done independently throughout baseline and intervention phase (50.5% and 57.6%, accordingly) since they did not need as much

assistance as students with severe disabilities. The social interactions did not change significantly from baseline to intervention (11.6% to 13.9%).

This study revealed differences in interaction behaviors between students with severe disabilities, students with moderate disabilities, and assistant personnel. While students with severe disabilities demonstrated high level of interactions with teachers during baseline that followed by increased behavior interactions with peers during peer tutoring conditions, students with moderate disabilities maintained low level of interactions with teachers and peers throughout the study. However, students with moderate disabilities demonstrated higher level of social interactions with other classmates than students with severe disabilities. The first study results replicate findings of previous studies demonstrating that peer tutoring can contribute the meaningful academic engagement and successful collaboration between students with and without disabilities in inclusive GPE (Houston-Wilson et al., 1997; Lieberman et al., 2000). The second study run contrary with other peer tutoring studies regarding the effect of peer tutors on development of behavior interactions between students with moderate disabilities and their nondisabled classmates.

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CHANGES IN PSYCHOSOCIAL ADJUSTMENT OF ADOLESCENT GIRLS IN THE LESSONS OF PHYSICAL EDUCATION

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The aim of the present study was to establish the changes in psychosocial adjustment of adolescent girls' employment modified lessons of physical education.

Material and Methods. The schoolgirls were selected for the experiment applying a two- stage sampling strategy: first, the school was selected from the list of Kaunas city secondary schools, then all the schoolgirls from 8-9 forms were tested (every second form was experimental). The experimental group (EG) included 14-15-year-old adolescent girls (n=128), and the control group (CG) – adolescent girls of the same school and the same age (n=137). Adolescent girls in CG attended physical education lessons which were not modified. The lessons took place two times a week (19). The girls in EG participated in modified physical education lessons two times a week. Once a month they had a theory class where they received knowledge on adolescents' communication disorders and ways of preventing them by means of physical activities. In practical classes the girls in EG had sports games (basketball, volleyball, football) enhancing physical abilities (1) and Pilates exercises. The girls in EG and CG underwent initial testing of their psychosocial adjustment, and later the girls in EG experienced experimental impact. After the experiment all the subjects in EG and CG were tested again. For the estimation of the level of adolescents' psychosocial adjustment and its components (self-esteem, domination) an adapted questionnaire of Rogers and Dymond was applied. An adapted questionnaire of Huebner was administrated to measure students' satisfaction with life.

Results. The analysis of the data demonstrated that when comparing the psychosocial adjustment of the adolescent girls of EG before and after the experiment, a statistically significant differences were established between the results before (53.81±8.34 points) and after the experiment (55.84±7.66 points) ($t = -2.03$; $p<0.05$) even though the same cannot be said about the results of the psychosocial adjustment of CG. The results of self-esteem scale for EG after the educational experiment changed statistically significantly (60.52±11.98 points) ($t = -1.99$; $p<0.05$) in comparison with EG results before the educational experiment (57.43±12.80). The level of dominance of the members of EG statistically significantly increased (from 44.04±13.13 points to 47.24±11.51; $t = -2.07$; $p<0.05$) even though the same cannot be said about the results of the level of domination of CG (42.42±11.22 points before the educational experiment; 40.91±10.94 points after the educational experiment) ($p>0.05$). After the experiment high life satisfaction was reported by 42.19% of girls ($\chi^2(2)=6.67$; $p<0.05$).

Discussion. It was established that psychosocial adjustment of adolescent girls in the experimental group and the components of this construct (self-esteem, dominance and indices of satisfaction with life) after the enhancement of psychosocial adjustment in the lessons of physical education were higher compared to those of the experimental group before educational experiment and those of the control group before and after the experiment. Barr-Anderson et al., established that interventions to increase self-efficacy and making physical education classes more enjoyable for girls may result in greater participation in structured physical activity and higher overall physical activity levels among adolescent girls. Scientists estimated that cheerleading/dance, dance, and swimming were traditionally popular physical activities among young females (2).

Conclusions. After the educational experiment the index of psychosocial adjustment in the experimental group improved statistically significantly ($p<0.05$), as well as the values of the three structural components of psychosocial adjustment: self esteem ($p<0.05$), dominance ($p<0.05$) and life satisfaction ($p<0.05$).

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MULTIFIDUS SIZE AND ASYMMETRY ALTERATION FOR HEALTHY AND LOW BACK PAIN WOMEN

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The purpose of this study was to establish the effect of multifidus size and asymmetry alteration for healthy and low back pain middle - age women.

Material and Methods. The research was performed in several stages. The middle-age women (n = 28) were divided into Experimental (EG) and Control (CG) groups. EG included those who felt LBP and whose age was 44.41±5.92 years. Their body weight was 68.10±8.94 kg, height — 166.41±2.81 cm. Ethics Committee Report number BE-2-24. **Testing and assessment of multifidus muscle CSA.** CSA of the multifidus muscle was measured from L2 to L5 vertebral segments with ultrasound „TITANTM" system (*SonoSite, USA*). The resultant image was displayed on the screen from which multifidus CSA were determined using electronic calipers. This process was repeated for each subsequent vertebral segment. Bilateral images of the multifidus muscles were obtained were possible except the cases of larger subjects where left and right sides were imaged separately (1). **Oswestry disability index questionnaire, a visual analogue of pain scale.** Oswestry Questionnaire (2) was meant to evaluate the influence of pain intensity of lower back on its functional state in different situations of the patient's life. The questionnaire consisted of ten questions with six variants of answers (A-F). Every question had to be answered choosing one most appropriate variant. **Exercises in the testing procedure.** The group of exercises was executed in supine position, knees bent (60° flexion) and feet on the floor. The following exercises was performed in four — point kneeling. At the start of each exercise, the examiner determined the subject's lumbar neutral spine position and the subjects were asked to hold this position throughout the exercise.

Research protocol. The tests were done three times for the experimental and control groups: the first testing occurred before exercises of training lumbar stability, the second – after 4 months, and the third – after 8 months of applying exercises for training lumbar stability. The subjects were engaged in an eight week exercise program of training lumbar stability (two times per week, 45 min in each practice session. At the beginning of the research, after four months and at the end of the research the women underwent the measurement of the cross-sectional area of the multifidus muscle for the experimental and control groups. Oswestry disability index questionnaire and a visual analogue pain scale were measured for the experimental group.

Results. *Multifidus muscle CSA.* Comparing the mean values obtained in the experimental group in the first and third measurements we found that after the lumbar stabilization exercise programme multifidus muscle cross-sectional area increased by 22% (in the right side) and 23% (in the left side) compared to the beginning of the study. The mean values of the second measurement were higher by 18% (in the right side) and 17% (in the left side) compared to the first measurement, and lower by 6% (in the right side) and 7% (in the left side) compared to the third measurement. *Evaluation of low back pain intensity.* We established a weak ($r=0.28$) and statistically insignificant ($p>0.05$) correlation between pain intensity and the multifidus muscle cross-sectional area. After the lumbar stabilization exercise programme low back pain decreased statistically significantly ($p<0.05$) by 65.7%.

Conclusions. At the beginning of the research, after four months and at the end of the research the women underwent the measurement of the cross-sectional area of the multifidus muscle for the experimental and control groups. After the core stabilization exercise program multifidus CSA significantly increased ($p<0.05$) in both groups. After the core stabilization exercise program low back pain intensity significantly ($p<0.05$) decreased for experimental group.

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ANALYSING THE RELATIONSHIP BETWEEN BIOMECHANICS AND PHYSIOLOGY OF PROFESSIONAL STANDARD SPORT DANCERS

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Sport dance training is a long process of physical, technical and physiological preparation, often beginning in childhood and continuing until retirement. Sport dance choreography is becoming complex (Wyon, 2010) with more sophisticated level of coordination required. It is important to note that dance performance is characterised by specific dexterity, harmony in movements and synchronisations with the partner. To define dance sport actions and movements is not particularly easy, because it can be made in an endless number of directions and often involve several parts of the partners' bodies (Dalla Vedova et al., 2006). The complex choreography and technical requirements are performed by the dancers at very high levels of energy expenditure throughout their competitive dance routines, with refined posture and properly set up partners contact. A more thorough understanding of the energy demands of competition would enable the prescribing of more specific training programs. Partners' correct posture and contact are indicative of the quality of dance and aesthetic perception (Koutedakis and Jamurtas, 2004). Depending on dancing professional skills of the couple, ability to continuously keep contact varies.

The aim of this study was to identify professional sport dancers' contact quality and physiological maintenance of mutual relationship during simulated Standard dance competitions. To pursue this aim we measured the following parameters for determining physiological capacity of maintaining dance capability: (Heart rate, Blood Lactate, Maximal Oxygen Consumption, and Ventilation per minute). Also, we analyzed partners' hips angular velocity during Slow Waltz, Tango, Viennese Waltz, Slow Foxtrot and Quickstep. Videos were captured with 10 high speed infra-red cameras (250 frames per second). Biomechanical characteristics were measured with a Motion Capture Smart system and heart rate and oxygen consumption were measured with a Polar, Lactate Pro and K4b2 methods. A group of 10 highly skilled competitive Standard dancers - 5 males and 5 females - (mean age 24.1 ± 3.4 years, body height 171.89 ± 7.2 cm, weight 61.7 ± 8.1 kg) were included in the study . The couples were dancing together at least 29.4 months and had approximately 15 years of dancing experience. Participants in the research were athletes of Standard dance. Simulated Standard competition performed for measurement consisted of a total 10 minutes trial including all 5 standard dances with 20 seconds interval between each dance.

Table 1.

Hips' angular velocity and physiological parameters correlation coefficients (* p = 0,05; ** = 0,001)

	Physiological parameters		
	VO2 max/kg	VO2 kg mean	VE (l/min)
Hips' angular velocity (deg/s)			
W max CCW			0.719
T max CW			0.655
T max CCW			0.645
V max CW			
V max CCW			
W mean (between CW&CCW)	0.636	0.724	
F max CCW			0.644
F mean (between CW&CCW)		0.65	

(CW stands for clockwise, CCW – counterclockwise)

Results proved that contact condition significantly influences physiological maintenance of professional ballroom dancers during competition. Nevertheless continuous contact keeping the hip line parallel on the transversal plane enables more effective and dynamic movements composition. Our results confirm partially previous findings in this sport, (Bria et al., 2011), (Blanksby and Reid, 1988) in respect to the physiological characteristics of the dancers. Differently from other investigations, our study was performed in top level Standard dancers, and we found significant correlations coefficients between partners' hips angular velocity and the Maximal Oxygen Consumption and Ventilation per Minute during dance (table 1). Such information can be useful for developing sport dancing training techniques and methodologies. Presented data can be helpful for understanding the performance model of this dance sport and customizing physical training programs for matching the couples and monitor their physical progresses.

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COMPARATIVE ANALYSIS OF FEMALE ELITE BIATHLETES' SPORTS RESULTS IN WORLD CUP COMPETITIONS BEFORE THE WORLD CHAMPIONSHIP AND DURING THE WORLD CHAMPIONSHIP IN THE SEASON OF 2010-2011

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Introduction. Modern training trend for biathletes is the increasing intensity of the training process in competition activities, individual optimization of competition activities according to individual training plan for the most important competition of the season – World championship.. Competition activities of elite biathletes while preparing for the main competition of the season have received little attention by researchers.

Research aim was to analyse the interaction of biathletes' sports results and the number of starts, and to establish the relation of this interaction between the results achieved in World Cup competitions and World Biathlon Championship.

Materials and Methods. The data have been retrieved from the documents of the International Biathlon Union (IBU): biathletes' results in the competition of E.ON IBU category, protocols of the World Biathlon Championship of 2011 and World Biathlon Cup competition. We analyzed the sports results of female biathletes who took the 1^{st} – 10^{th} places in the World Biathlon Championship in individual events. The research sample included 20 high-capacity world biathletes. The data were processed applying Microsoft Excel 2003 programme and special statistical programme SPSS 12.0 for Windows. We calculated arithmetic means, standard deviations (SD), coefficients of variance (V), and coefficients of correlation (r). Regression analysis of the data was performed.

Results. In the season of 2010–2011 there were 19 individual biathlon races in the women's programme in the World Biathlon Cup competition before the beginning of the World Biathlon Championship: 11 of them were middle and long distance races (pursuit – 10 km, individual start – 15 km, mass start – 12.5 km) and eight sprint competitions – 7.5 km. The first biathlete in the general account of the World Biathlon Cup competition was German biathlete H.A. She participated in competitions 19 times. In the World Biathlon Championship Biathlete H.A. did not win any medal in individual events, and her best result was only the fourth place in 10 km pursuit race. In other distances she took the 13^{th}, 20^{th}, and the 46^{th} places. In the World Biathlon Championship the best biathlete was M.K. who won two gold medals and one silver medal. Before the world championship she participated in competitions 17 times and in general she was in the fifth place. It is interesting to note that biathletes B.T. and S. V. won silver and bronze medals in the World Biathlon Championship, but in the general account of World Biathlon Cup competition they took only the 18^{th} and the 19^{th} places, and before that they had participated in competitions 19 and 14 times. World elite biathletes participated in E.ON and IBU category competitions 16.2(3.74) times before the World Biathlon Championship. The number of starts correlates with the places taken by biathletes in the general account of the World Biathlon Cup before the world championship (r=-0.83), the places taken in the general account of individual start races (r=-0.36), mass start races (r=-0.62), pursuit races (r=-0.75), and sprint (r= -0.75). In the individual events in the World Biathlon Championship the medals were won by biathletes who had taken the 2^{nd}, 3^{rd}, 4^{th}, 5^{th}, 6^{th}, 18^{th}, and 19^{th} places in the general account of World Biathlon Cup.

Conclusion. The preparation of elite biathletes for the most important competition of the season - World Biathlon Championship is grounded on the repeated participation in the World Biathlon Cup competitions. The places taken in the general account of the World Biathlon Cup are the indices of biathletes' mastery and stability. Biathletes, taking the 1^{st} – 10^{th} places in the general account of the World Biathlon Cup, are real applicants for medals in the World Biathlon Championship.

THE RELATIONSHIP BETWEEN SELF-CONTROL ABILITIES OF THE 9–10 YEAR OLD SCHOOLCHILDREN (BOYS AND GIRLS) AND PHYSICAL ACTIVITY

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Research aim – to assess the correlations between 9-10 year-old students' self-control skills and physical activity. The research was conducted in randomly chosen Klaipeda City and Region general schools, in primary classes, in February- March, 2010. Research ethics requirements were being followed. 9–10 year-old primary school pupils participated in the research (n = 176), including 47,7% girls and 52,3% boys).

Research methods: analysis of specialist literature, survey applying questionnaires, mathematical statistics. The questionnaire of self-control evaluation was designed on the basis of the programme To Grow and Strengthen (2004) of Lithuanian physical culture, as well as folowing Social Skills Inventory for Emotional Control and Social Control by Riggio and Friedman (1983).

Physical activity (PA) was determined according to the short form of the modified international PA (IPAQ) questionnaire (Ainsworth, Levy, 2004). Following modified recommendations (Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ) – Short and Long Forms, 2005), all the respondents were classified in low, average, and high PA groups according to general PA span.

Research results. Satatistically significant psychosocial self-control differencies depending on gender were determined: in many cases girls have better psychosocial self-control abilities ($p < 0,01$). They are better at keeping to the rules of a game ($p < 0,001$), acting up to a promise and applying the undertakings ($p < 0,01$), making themselves act as if an activity is pleasant for them ($p < 0,05$), getting along with all kinds of people ($p < 0,001$), noticing their state of mind($p < 0,01$), mood ($p < 0,05$), assessing if they are flexible($p < 0,05$), dressing properly according to the weather conditions ($p < 0,01$). Boys are better than girl at controlling their fears, anxiety ($p < 0.01$). The weakest students' physical self-control abilities are the ability to assess one's pulse and understand one's physical activity, result differences depending on gender, however, are not significant.

The research results confirmed that boys' general PA span was statistically significantly bigger than girls' ($p<0.001$), however, more girls than boys were averagely physically active ($p<0.001$). The differences between high physical activity groups and walking by gender were not statistically significant. The correlative analysis of physical activity and self-control skills revealed the correlations between PA span and certain self-control skills.

Conclusions:

1. Satatistically significant psychosocial self-control differencies depending on gender were determined: in many cases girls have better psychosocial self-control abilities ($p < 0,01$), boys are better than girl at controlling their fears, anxiety ($p < 0.01$). The result of physical self-control abilities differences depending on gender are not significant.
2. PA differences by gender were determined: boys' general PA span was statistically significantly bigger than girls ($p<0.001$), however, more girls than boys were averagely physically active ($p<0.001$).

The differences between high physical activity groups and walking by gender were not statistically significant.

3. Correlations between PA span and certain self-control skills were determined: the ability to assess pulse frequency in quiet state ($p<0.05$), after physical exercises ($p<0.001$), the ability to assess if the pulse is normal ($p<0.005$), the ability to notice and assess one's condition ($p<0.05$), mood ($p<0.05$), tiredness ($p<0.05$), changes in blood pressure ($p<0.05$), the ability to understand if one has endurance ($p<0.05$). The correlations between psychosocial self-control and physical activity were not determined.

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COGNITIVE AND SENSOMOTOR FUNCTIONS OF ELITE ATHLETES OF DIFFERENT SEX

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Introduction. Modern sport is characterized by emancipation, assimilation of female sportswomen alternative, purely "male" sports (Lubisheva L., 2004). In addition to morphological and functional changes that occur in the body of women under occupation power-speed "male" sports, there are also changes in mentalities: the behavioural reactions and psycho-emotional individual traits (Niaury D.A., Evdokimova T.A., Kurganova M.U., 2003). In general, there is the thought of levelling of sexual dimorphism in some sports with increasing skill level in athletes (women) [Soboleva T.C., 1997, Negri-Cesi, P., A. Colciago, 2004]. In our view, this thesis is somewhat subjective and does not consider the peculiarities of sexual dimorphism for individual-typological characteristics of athletes. The **aim** of study was to study the cognitive and sensomotor functions of elite athletes of different sex.

Methods. To determine the influence of sexual dimorphism on mental characteristics in elite athletes, 24 sportsmen (18-27 years old) (17 men and 7 women members of National Judo Team of Ukraine), 20 sedentary men and 20 sedentary women (20-29 years old) were studied.

The cognitive and sensomotor characteristics of athletes were examined by a computer system “Diagnost-1”. The functional mobility and strength of nervous processes, visual perception, attention, memory and thinking were registered for each person.

Results and discussion. The results of neurodynamic functions studied of judokas in different sex are showed that the latent periods of simple and complex motor reaction as well as strength of the nervous processes are statistically significant differences between men and women. The decreasing duration of latent periods of simple and complex motor reaction in men for compared women is shows about improvement of sensomotor response. A similar trend is observed the concerning of nervous processes. The data of neurodynamic functions of sedentary persons in different sex are showed the decline of duration of latent periods of complex motor reaction in women is signified the increasing of speed of sensomotor reaction. At the same time the functional mobility of nervous processes was significantly better in men for concerning women.

Thus, obtained results confirmed significant difference of sexual dimorphism indices in athletes and sedentary people. It was determined that sexual dimorphism manifestations in athletes were as follows: short memory capacity (62.58$\pm$3.21%) and coefficient of operational thinking (2.67$\pm$0.16 standard units) was increased in women in comparison with men (55.78$\pm$2.07% and 1.44$\pm$0.30 standard units, $p<0.05$, accordingly), to the contrary neurodynamic functions were decreased in women (latent time of simple (266,92$\pm$4,73 ms) and composite (494.44$\pm$6.38 ms) visual-motor reactions and power of nervous processes (18.49$\pm$8.93 %) in comparison with men (239.62$\pm$5.26 ms, 440.10$\pm$6.61 ms, 5.33$\pm$0.59 %, $p<0.05$, accordingly). Obtained results indicate influence of sexual dimorphism on psychophysiological functions.

Conclusions:

1. Psychophysiological feature of sexual dimorphism in sportsmen of high qualification, compared with sedentary persons, is the development of cognitive function in women, and improving the value of neurodynamics in men.
2. Due to the peculiarities of information processing in women observed improvement of short-term memory and operational thinking.
3. In men, the organization of information processing is characterized by greater determinism, especially in sedentary persons than in athletes.

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THE EFFECT OF CONSTANT AND VARIABLE SKILL LEARNING CONDITIONS ON FREE THROW SHOOTING ACCURACY

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Introduction. Standard and constant practice conditions assist in mastering a movement that later will be performed automatically, whereas variable conditions of practice allow the player better to retain the skill, especially when it will be necessarily practiced in dynamic situations. Therefore, during the practice sessions, constant conditions of training are organized for coaching the skills, the conditions of use of which do not vary, whereas variable training conditions are provided for coaching of skills, the situations of use of which vary. Still, some research has been conducted that resulted in conclusions, maintaining that variable conditions of training may even be more useful for educating skills, the situations of use of which do not vary (Ghodsian, Bjork, Benjamin, 1997; Shoenfelt et al., 2002). Therefore **the goal of** our **survey** has been to determine and assess the effect of different conditions of learning on free throw shooting accuracy.

Hypothesis of the Survey – use of variable conditions during training sessions is more advantageous than use of constant conditions when a motor skill is a constant and invariable one (free throw shooting).

The subjects. Second year students at Lithuanian Academy of Physical Education (aged 20.4 ± 0.8 years, n = 99).

Methods and organization: Prior to the teaching, after the teaching and after a 3-week break, testing sessions had been conducted – free throw shooting tests (30 free throw attempts when throwing in series with 3 throws each) with recording of number of successful free throws and the accuracy. Three groups of subjects in different learning conditions, during each training session (15 sessions) over five weeks, had been performing throws into the basket (n=30). The group of invariable training conditions had been coached in constant conditions during the entire period of training, they were performing throws from the free-throw line only. Group I of variable training conditions had been coached to perform throws into the basket during the training session in the known to them direction of movement (in a circle). Group II of variable training condition had been taught to throw into the basket in the unknown to them direction of movement– a partner at his/her own discretion had indicated the point of throwing while passing the ball. Both groups of subjects, which had been taught in variable conditions, did not perform free throws from the free-throw line.

The Results. Due to learning, the free throw performance indices of all three groups under survey that had been coached in different learning conditions improved markedly ($p < 0.05$) in comparison to the beginning of the learning. During fifteen practice sessions, the greatest change in learning in comparison to the first training session had been established in the Group that had been taught in variable conditions moving in unknown in advance direction: 174.0 ± 52.6 per cent. The skill mastering indices when learning in variable conditions in known moving direction increased by 165.0 ± 41.6 per cent, while indices of those who has been taught in constant learning conditions increased by 153.8 ± 29.8 per cent in comparison to the beginning of the learning. The performance indices during skill retaining test (after 3 weeks) decreased markedly of those participants that had been taught in the constant learning conditions ($p < 0.05$), while the free throw performance indices of participants that had been taught in variable learning conditions remained unchanged ($p > 0.05$).

Discussion and Conclusions. The results of the survey have demonstrated that teaching of a constant motor skill – free throw shooting - in the constant conditions is not better than the teaching in variable conditions, still the participants, who had been taught in variable conditions, have demonstrated better results during the further test of skill retaining than participants who had been taught in invariable conditions. The greatest change in skill mastering had been achieved during the first five training sessions, while during the remained ten training sessions, the change in mastering had been varying insignificantly.

SHOOTING RESULTS CHARACTERISTICS OF VARIOUS AGE GROUPS BIATHLETES IN THE 2011 WORLD CHAMPIONSHIPS

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Introduction. Biathlon – is a complex winter sports, that combines cross-country skiing with rifle marksmanship. Cyclical cross-country load in biathlon combines with acyclical actions in the fire range, witch requires complicated movement coordination. Final competition results and success in biathlon is decided not only upon being able to ski fast but also being able to shoot acurately. Also big difference makes being able to swap in activities at shooting range and control psychical pressure, especially in shooting range (Сорокина, 2010). Physical fitness of biathletes is highly influenced of $V0_{2max}$ and upper body strength in cross-country skiing. Influence of the shooting for the final results, has a significant relationship between shooting time and accuracy (Cholewa, Gerasimuk, Zajac, 2004; Hoffman et al., 1992; Rundell, Bacharach, 1995).

Shooting in biathlon, is a complicated motor activity which requires position stability, high concentration and psychomotorical skill level, preliminary rapid preparation actions to assure fast and accurate shooting in both positions. Moreover, shooting in biathlon is highly influenced by various internal and external factors. Main internal factors are psychophysical, technical, tactical and psychological. Main external factors are social, climatic and factors which are related with sports equipment (Hoffman et al., 1992; Grebot, Burtheret, 2007).

Aim of our study was to explore shooting accuracy results of various age groups biathletes in the 2011 world championships and reveal fundamental differences between age and gender aspects. For data analysis the total number of subjects are 480. Youth group (age: 17-18y.), junior group (age: 19-20y.) adult group (age: 21-41y.). The study was conducted by analyzing official protocols of youth, junior and adult in 2011 year championships. For data analysis used descriptive statistical methods.

Results. Research results revealed main differences in various age groups of strongest biathletes in shooting results characteristics. The major difference of shooting accuaracy among men was determinated by analyzing shooting results in prone position of individual event (20 km): youth man shooting accuracy equal 85%, while adult – 95.8% ($p<0.001$). Biggest difference among woman shooting accuracy was determinated by analyzing sprints event (7.5 km) results. Youth woman shooting accuracy in prone position was 78%, meanwhile, this index among adult woman reached 94% ($p<0.005$). Analysis of shooting accuracy results between junior and youth age groups, man and woman genders, statistically significant differences were not found.

General features has been found – shooting accuracy in prone position has tendency to increase among youth man and woman groups. However, data analysis revealed an interesting fact, that junior man and junior woman, in both sprint and individual events, shooting accuracy results were lower standart than youth biathletes. Analysing data by gender, has revealed junior woman shooting results in prone position are higher standart than junior man ($p<0.025$) (junior woman – 86%; junior man – 81,75%)

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PHYSICAL FITNESS AND ORIENTEERING ABILITIES OF DIFFERENT AGE YOUNG ORIENTEERS DURING AN ANNUAL TRAINING CYCLE

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Introduction. Orienteering sport is very specifical sport. It is distinctive in terms of possessing both highly cognitive (psyhological) and highly physical components. Eccles (2006) and Seiler (1996) notes that efectivity in orienteering sport events is achieved by being the fastest to navigate through points, known as controls, in the environment. Based on the information on the map, the orienteer must choose a route through the environment to reach each control in the order specified. This route must afford good performance time. When making a decision about routes, from the map, the orienteer might consider factors such as distance, amount of ascent, runability, and the presence of obstacles. In order to navigate a chosen route to the controls, the orienteer must be able to relate information in the environment to certain symbols on the map, and vice versa. That is why at orienteering event contended physical and psychologycal loads needs for a special preparation. Воронов (2003), Чемихина (2006) and Grajauskas (2008) emphasize that during young orienteers training process coaches must pay more attention for parallel preparation of physical fitness and orienteers abilities, it is very important that training methods could be more diverse.

The aim of study is to observe physical fitness and orienteering abilities of 11-17 years old young orienteers during an annual cycle.

Method. Research was carried out during 2010-2011 y., with 127 sport school young orienteers (boys). In attempt to observe different age young orienteers physical fitness and orienteering abilities during an annual cycle orienteers have been tested free times. The tests have been taken at the beginning and at the end of the preparation period, as well as during the competition period. Tests of physical development, physical fitness, orienteering sport knowledges and cognitive tasks (visual attention, speed of perceiving information and visual memory) have been applied. Youg orienteers was divided and investigated in different sport preparation groups: initial training - youg children (10-11 y. old) and children (12-13 y. old) and preparation of excellence – young juniors (14-15 y. old) and juniors (16-17 y. old.). Experimental research have been applied. Experimental group young orienteers (n=68) from different preparation groups used to use experimental orienteering abilities training program, at the time young orienteers from the control group (n=59) used to use their own training programs. Statistical analysis, have been applied by SPSS program.

The research results show that during annual training session at different preparation periods experimental and control groups young orienteers physical development and physical fitness data was different at those groups. At experimental program was special emphasis to orienteering sport abilities development. During an annual training sessions coaches focus more attention to special development of visual memory, concentration of attention, understanding of special orienteering maps and other technical tasks. Orienteering training sessions were organized not only in nature but and in classrooms. Due to that at the end of experiment experimental groups special orienteering abilities and cognitive processes data had tended to improve.

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AGE–RELATED CHANGES IN CONTRACTILE PROPERTIES OF KNEE EXTENSOR MUSCLES IN WOMEN: ASSOCIATION WITH PHYSICAL ACTIVITY

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Introduction. It has been established that the change in electrically evoked twitch contractile properties of the human skeletal muscles – force-generation and force-potentiation capacity, speed of contraction and relaxation of the muscle fibres, is also a typical feature of ageing. Regular physical activity has been commonly advocated as an approach to reduce the impact of ageing on human neuromuscular function (Roubenoff and Hughes,2000; Kuu, 2006). However, the effect of long-term recreational gymnastics practised often by women on age-related changes in contractile properties of skeletal muscles is not well understood. This study examined the effect of recreational physical activity on the contractile properties of skeletal muscles in elderly women. Twenty-two young (20-29-year-old) and 33 elderly (69-78- year-old) women participated in this study. The subjects were distributed into three groups: 1) young recreationally physically non-active (RPN) women (n=22); 2) older recreationally physically active (RPA) women (n=17); 3) older recreationally physically non-active (RPN) women (n=16). RPA women had exercised regularly in groups of recreational gymnastics (programme included flexibility, relaxing and stretching exercises) for more than 10 years, 2 times per week. Isometric twitch of the knee exrensor muscles was evoked by supramaximal electrical stimulation of the femoral nerve in resting and post-activation potentiation state. A greater maximal isometric voluntary force (MVC) and potentiated twitch peak force (PF) were observed in the young women compared with the two elderly womens groups. These characteristics in measured elderly womens groups did not differ significantly. A shorter twitch contraction time (CT), resting and potentiated half-relaxation time were found in the young RPN and elderly RPA women compared with the elderly RPN womens group. In the present study, postactivation potentiation was greater in the young RPN (133%) and elderly RPA (130%) women compared with elderly RPN (120%) women. No significant differences were found in maximal voluntary force-generation capacity in elderly womens groups. An increased speed of isometric twitch contraction, postactivation relaxation and greater postactivation potentiation capacity in knee extensor muscles were found in elderly RPA, compared with elderly RPN women.The regular recreational gymnastics did not have a marked effect on voluntary force-generation capacity, but increased speed of isometric twitch contraction and relaxation time, and also increased postactivation potentiation capacity in knee extensor muscles in elderly RPA womens.

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PHYSICAL RECREATION ACTIVITIES OF 45-55 YEARS OLD PEOPLE IN CITY MADONA

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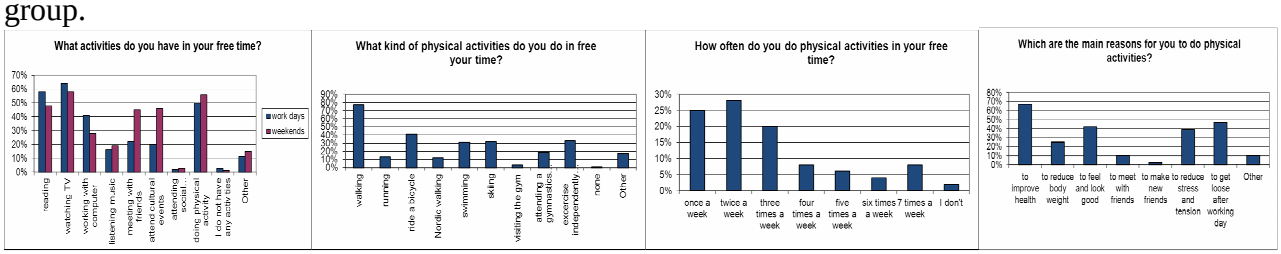
Introduction. Higher living standards and improved quality of life resulting from the rapid integration of the achievements of science and technology into the life of modern man have affected man's life style in different ways. Unfortunately, not all of these effects benefit the human body and health. Life has become physically less demanding. With less effort and less physical activity needed our modern life tends to facilitate immobility among general population. Physical activity is an essential health affecting factor at any age and the case for exercise and physical health is now widely accepted by medical authorities across the world. [3-6].

The aim of the study is to inquire 45-55 years old people physical recreation activities in city Madona.

The methods of the study are theoretical investigation of scientific literature; inquiry – questionnaire and mathematical statistics.

To explore types, level, volume, habits of physical recreation activities we develop questionnaire "Physical activity in my life", which is modified form of questionnaire from Eurobarometer 72.3, Sport and Physical Activity, 2010 [1].The survey took part in city Madona from September 2011 till March 2012. In Madona are 1.398 people at the age group of 45-55 years. We surveyed 302 people at this age group.



The most popular free time activities for 45-55 years old people in city Madona are: TV watching, reading and engaging in physical activities. The study "Physical recreation activities of 45-55 years old people in city Madona" data show similar results, as Eurobarometer "Sport and Physical Activity", 2010. Latvian people who engaged in physical activity, better prefer not to organized sporting activity (specific sports or activities), but the 'informal' activities - biking, walking, swimming, etc. In city Madona the most popular physical activity are walking (77%), bicycle riding (41%), exercising at home (33%) and swimming (31%). In such physical activities Latvia is the leader of EU Member States - 44% of Latvian citizens do it regularly - at least 5 times a week (Eurobarometer), but the majority of the population of city Madona 1-3 times a week. The main motivations for physical activity are health improvement (60% of the Eurobarometer, 67% in Madona), relaxation and stress reduction after working hours (41% Eurobarometer, 39% in Madona), weight reduction (18% Eurobarometer, 25% in Madona) [2].

The study "Physical recreation activities of 45-55 years old people in city Madona" is a custom research from the city Madona.

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IMPACT OF VOLLEYBALL EXERCISES ON COORDINATION SKILLS OF 14-15-YEAR-OLD GIRLS

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Introduction. Finding co-ordination skills training tools for adolescents is not easy, because it is needed to evaluate many factors influencing the teenager. Looking for new technologies in physical education is prompted by the fact, that many secondary school age students have formed a stereotype of passive learning. Furthermore, the higher grade is, the more passive pupils are, their levels of physical activity decreases, therefore means and techniques used in physical education (PE) lessons should be both acceptable and liked by adolescents, as well as effective. There are given various means for training and efficacy of co-ordination skills in physical education classes for students of all ages by Katinas, Vilkas (2002, 2010), Kviklienė (2001). Looking for new opportunities of variety in physical education classes, for our research we have chosen different but, in our opinion, equivalent means what concerns education: volleyball and exercises of general education for developing girls' coordination skills. These means were a key factor in differentiating work of our research groups. **The aim** of research is to analyze the changes of coordination skills of 14-15 year-old girls' caused by education through volleyball exercises during physical education lessons.

Method. The study was conducted in a gymnasium in Vilnius in 2010-2011 school years. The study included general medical groups, 14-15 year old female students (n=42), who do not go in for sports. In a convenient way there were two groups formed: the experimental group (E) (n=21) – in the main part of physical education lesson, did by us suggested volleyball set of exercises for 16-18 minutes and the control group (K) (n=21) - the main part of physical education lesson, did general PE set of exercises for 16-18 minutes. During the experiment, the two groups had equal conditions for doing sport, worked according to the physical education program, the number and structure of lessons in both groups were the same. The educational experiment lasted for three months. To determine the level of students' co-ordination skills the following tests were used: *Flamingo balance, 10x5 m shuttle run* (Eurofit, 1993), *Three rolls forward, Backwards Long jump from the local* (Liach, 2006). The level of co-ordination skills was assessed at the beginning and the end of the experiment.

Results. At the beginning of the research, co-ordination skills of the control and experimental groups were similar. At the end of the experiment co-ordination skills of the experimental group had a tendency to improve, though only the balance indicators (flamingo test) improved statistically significantly ($p < 0.01$). It should also be noted at the end of the educational experiment (having compared the results to the experimental group and to those of the control group), the results showed a statistically significant difference only compared the flamingo test's results ($p < 0.025$). Liach (2006) believes that the best period to develop the skills of coordination is middle and senior school age. So the results we got partially confirm Liach's assertion: all indicators of the girls in co-ordination skills test performance have improved, but the one was statistically significant.

Conclusion. At the end of the study it was found out, that our program for improving girls' coordination had a little effect, although there was observed the tendency of improving results. We believe that the impact would be greater if these exercises were applied for a longer period of time.

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CREATIVITY IN PHYSICAL EDUCATION: PERSONAL ASPIRATIONS AND INSTITUTIONAL BARRIERS

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Introduction. Creativity is one of most relevant topics in current educational discourse in European Union and Lithuania. Teaching creatively is a requirement for teachers of various subjects but creativity is interpreted and manifests in different ways in the curriculum of different subjects. Physical education is specific area related to health education, physical activity, healthy diet and many others. Nevertheless creativity in physical education is still under-researched. There are few descriptive studies (e.g. Dumčienė ir kt. 2007; Bakienė, 2006) but there is no holistic viewpoint about qualities of creative physical education teachers and expression of creativity in physical education. Most of criteria of creativity come from other subjects and the specific qualities of physical education are underestimated. **The purpose** of the study is to analyze personal and social factors, which impact the creativity in the field of physical education.

The method of interpretative phenomenological analysis was used in the study. Ten creative teachers were chosen to participate in the study. Semi-structured interviews were conducted and analyzed according to methodological guidelines of IPA. Respondents were asked to describe their frame of reference concerning creativity in professional activity, organizational culture, and attitudes toward professional development. Ideographic methodology enabled to single out personal and social factors important to creatively working physical education teachers. Common factors for all respondents were indicated and conclusions were made.

The results indicated that creativity of physical education teachers is related to personal characteristics: self-efficacy and intrinsic motivation. There are two characteristics which lead to aspirations to work creatively. Physical education teachers' creativity comes from the personal factors. Creative self-efficacy is of primary importance. It leads to motivation and desire to experiment, develop and apply new methods for movement education, to integrate theoretical knowledge and practical skills. Success in employing original methods leads to positive emotions of joy and satisfaction.

Social and institutional factors also exist and impact creativity. Organizational encouragement, supervisory encouragement and sufficient resources are also important for physical education teachers. Still there are also obstacles for creativity in schools' context. Teachers emphasized devaluation of physical education importance. The narrow-mindedness concerning curriculum of physical education manifests in the way that some pupils treat physical education only as sport games. Another problem comes from expectations for wins because teachers feel pressure to participate in various competitions and there is not enough time for health related topics, non-traditional sports or sheer enjoyment in experimentation with various movements. Teachers face difficulties in motivating pupils to do sports creatively. Pupils' motivation for sports is not favorable for creative work. Some pupils do sports because of social status in peer group or good appearance. That is why it is difficult for physical education teachers substantiate for the pupils the importance of physical education. There are also some advantages in schools social context. Teachers' of physical education feel expectations to be creative, especially in the area of interdisciplinary integration. They also emphasize supervisors support and encourage participating in various activities crossing boundaries of physical education lessons. The findings of qualitative study let draw conclusion that the sources of physical education teachers' creativity comes from teachers' personality. Social and institutional context has both positive and negative impact on physical education teachers' creativity. The facilitation of physical education teachers' creativity might start from emphasizing holistic approach to health education and physical activity.

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THE THEORETICAL ASPECT OF CULTURE CAPITAL MODEL: CONTEXT OF SPORT SKILLS

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Relevance and problem: in the society of Lithuania and the entire world we can notice the dimension that culture capital of individual determines his elective profession. Culture capital of individual is affected by various cultural and societal factors thus it either approaches to the classical conception determined by P. Bourdieu or deviate from it. Every person despite his professional technique (sportive, managerial, and communicative) always relates himself not only with his particular working activity but also with usable cultural forms which are determined by cultural capital. Namely cultural capital forms the direction of profession activity choice.

In this paper authors analyze conception of cultural capital and introduce new model which can become an instrument for identifying cultural capital of individuals who are seeking for sportive technique.

Aim: create cultural capital model.

Hypothesis: individual choice of sports depends on his cultural capital.

Organization of research. Accomplished analysis of literature let authors state the proposition that cultural capital is one of the most important capital beside societal and economical (Bourdieu, 2001). For determining available resources of education, social life, science and culture, P. Bourdieu extended the idea of capital (which is derived from Marxism ideology and which was used for determining economical categories) and suggested the idea to introduce the conception of cultural capital. Cultural capital of individual is inseparable from intellectual capital which reveals inborn capacity and acquired abilities; from education capital which is structured from available education resources (diploma or degree); from ethical - value capital; symbolical capital (Bourdieu, 1981, 1984). Individual develops his cultural abilities by participating and using different cultural forms. Personal lifestyle of individual uncloses depending on the forms and sorts of adopted culture. It should be noted that the social status of individual transmits cultural signals (attitudes, behavior, caliber, knowledge) which characterize available cultural capital (Bourdieu, 1977). According to cultural capital theory of P. Bourdieu, authors of this paper propose new culture capital model which will be applied to analyze the individual choice of sports. In this model authors use 5 cultural capital dimensions which are important for prospective empirical research: cultural knowledge of individual; linguistic abilities, usable cultural forms (theater, cinema, literature, art, music, and dance); individual education, available cultural resources (books, paintings, and music records).

This suggested model can be applied to representatives of other profession groups for analyzing influence of available cultural capital to the choice of profession.

Keywords: cultural capital, sport skills.

ENTREPRENEURSHIP INFLUENCE OF NEW TOURIST SERVICES - PRODUCT DEVELOPMENT PROCESS

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Introduction. The growing role of tourism in the world and the country's economy, this translates to rethink the importance of economic sectors and the role of the country's economic growth. For the market to thrive it needed to offer these new services or products with which consumers associate the potential of their satisfaction, but the original and come up with a new service and its implementation can not for everyone. The researchers indicate that the perception of entrepreneurship is the process of many changes. Business organizations are faced with new challenges posed by the general market trend: the globalization of business, hipercompetition, rapid technological change, knowledge and information society formation. These features of the business environment of organizations and people working in them, require a certain way of behavior, characterized by such features as: innovation, risk tolerance, proactivity, the ability to identify opportunities and implement them. This set of properties and behavior scientists call entrepreneurship. Entrepreneurship - individual or organization-level response to a rapidly changing environment, the challenges of an operational mode, characterized by such features as observation opportunities, pro-activeness, innovativeness.As we know an entrepreneur - a man who introduces new technologies to increase efficiency, productivity, or create new products - services. Any properties entrepreneurship encourages him to do so? Do entrepreneurship influence of new tourist services - product development process?**The aim*:*** to find out what is the impact on entrepreneurship new tourist services - product development process.

The study methodology. Literature review revealed that although there is no one universal definition of Entrepreneurship, however, many authors agree that entrepreneur have certain similar characteristics and behavior patterns. Different authors point out in entrepreneur different characteristics and properties of these numbers. To summarize the scientific discussion on the characteristics of entrepreneur number, we can rely on Lessem (1986) claims that there is no entrepreneur, who all possess the same degree entrepreneur properties (innovator, inspiration, transforming, revolutionary, combining the leader, responsibilities, structuring, monitoring, will, risk-taking propensity, power, inspiration, sociability, shared values, adventurer and aggressiveness, activity, diligence, activity, flexibility, able to adapt, understanding, curiosity, and so on.

Many scientists (Covina and others, 2000; Dess and others, 1999; Russell, 1999; Antonic and Hisrich, 2001; Ireland, Hitt, and screens, 2003, Zahra, Jennings and Kuratko, 1999; Kirby, 2000) in terms of the complex and rapidly changing business environment, firms are not entrepreneurial activity, reduce their likelihood of successful competition in the market. In other words, an organization to survive in

today's world, to become entrepreneurial. Empirical research has been selected a qualitative study (data receiving method of semi-structured interviews). The study was conducted in March 2012. Respondents: entrepreneur representatives of the tourism sector (hotels, Rural Tourism Association, tourism companies, restaurants, tourist information centers).

The Results. The obtained results showed that the most important characteristics which must have entrepreneur is intuition, creativity, excellence, continuous monitoring of the environment, the tendency to take risks. Entrepreneur creating new services - the products, experience the psychological satisfaction (as almost all the respondents thought). The economic benefits and social security has also been mentioned many times. It turns out that many believe entrepreneur desire to encourage the development of ideas "...to raise your ego..." and increase personal income, in case of success - the image of yourself up that you are irreplaceable, personal satisfaction seeing a satisfied customer, "...who you shall open again, though, and loads...". In entrepreneur properties are achieved there will be an original tourist services - product. According to respondents, as it guarantees prosperity for yourself and to accumulate experience. Entrepreneur meet one of its most important needs - renewal.

Conclusions: Various scientific literature referred entrepreneur characteristic features are important and affect the tourism development of new services - product development, but entrepreneur’s ideas "gives birth" from the experience, ability to think in unconventional and balanced risk taking.

ELITE ATHLETE DEVELOPMENT: CURRENT ISSUES AND PERSPECTIVES

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Introduction. Developing a child to an elite athlete is a long-term training and complex process. It is not enough to apply the ten-year or 10,000 hour rule because of a lot of others factors are indicated to perform optimal trainability (Balyi, Hamilton, 2004). There is no agreement between scientists and practitioners how to identify talented young athletes (Vaeyens et al., 2008), what training program to apply, in what age to start specialized trainings, when and what ergogenic aids to use, which organizational structure for athletes long-term development would be suitable. **The purpose of the study** – to investigate current issues of elite athlete development system and discover future perspectives.

Methods. The methods employed for the study includes review of literature and meta-analysis.

Results and discussion. The primary goal of a long-term athlete development model (LTAD) is to ensure that children learn fundamental movement skills (Balyi, Hamilton, 2004). Movement skills in early stages of child development are very important to prepare for elite sport – it is proven by longitudinal studies (Malina et al., 2004, Elferink-Gemser, et al., 2007). Technical skills talented kids needs to excel in a particular sport specialization (Elferink-Gemser et al., 2007). According to long-term athlete development models in Canada, Australia, United Kingdom and etc. first steps to do physical education starts from 3–5 years depending on sport type. According to Balyi and Hamilton (2004) initial movement skills should be developed from 2–3 years. A fundamental movement skill is important for next step – specialization. Early specialization sports require a four-phase LTAD model while a late specialization model requires six phases LTAD (Balyi, Hamilton, 2004). Depending on the chronological age and sports type the specialization may vary (females 14–17 years of age, and males 15–18 years of age). There are lots of factors to indicate natural talent for elite sport (Elferink-Gemser et al., 2007). Physical, technical and psychological tests are required to indicate talented person, but today it's not enough to focus on one program or model. Due to the lack of scientific approach for most talent identification programs we can lose an innate talent (Vaeyens et al., 2008). 'The differentiated model of giftedness and talent' indicates that development process has negative and positive impacts on formation of an elite athlete (Vaeyens et al., 2008). That's why for talented athletes are needed a minimum of 10 years of intense practice to succeed. All processes of development an elite athlete must be organized from early childhood (Malina et al., 2004). New skill acquisition is necessary to reach a professional level. Today sports organizations must take a responsibility how to provide best infrastructure for potential elite athlete and how to ensure that in all stages of long-term development process best coaching experience will be implemented. Which way will be the best for athlete – centralized or free system of development, individual or general coaching approach (Elferink-Gemser et al., 2007). Issues such as the rise of global sports market, technological and medical achievements are creating a "new elite athlete". Competition is rising in all processes of an elite athlete system development – starting from talent detection, identification, organization and ending with financial support. System of elite athlete development became less predicted and all new factors needs to be put into perspective – how to produce not just an elite athlete, but also the socialized personality (Vaeyens et al., 2008). Scientists and practitioners must take into account that more and more countries is starting to create talent identification programs and long-term athlete development models. Can world sport society take this new issue?

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CHANGES IN ELECTROMYOGRAPHIC PARAMETERS DURING CYCLING EXERCISE AT CONSTANT INTENSITY

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Introduction. The aetiology of muscle fatigue is very complicated, especially in endurance sports [1, 2]. There has been investigations on training quality relationship with muscle strength and sEMG activity [3], but little is known on the effect of fatiguing submaximal dynamic exercise to organism functions among athletes of different sports.

The aim of this study was to evaluate the changes in surface electromyography (sEMG) parameters during 30-minute cycling exercise (250 W) at constant intensity in laboratory conditions.

Ten best Estonian male cyclists (aged 20-30 yrs) participated in this study. Two cyclists belonged to the Estonian professional cycling team, three cyclists belonged to a French amateur team and five participants were freelancers. The subjects performed 30-minute cycling test using their own racing bicycles fixed to the ergometer Taxc Cosmos. The sEMG power spectrum median frequency (MF) of rectus femoris, vastus lateralis, biceps femoris and erector spinae muscles was recorded by electromyograph ME6000 (Kuspio, Finland). Heart rate was registered by Polar heart rate tester (Finland) and the subjective rate of fatigue by Borg scale. All these three parameters were measured in the beginning, during and at the end of exercise. Maximal voluntary contraction (MVC) force of the knee extensor muscles was assessed before and after the end of exercise by custom-made-dynamometer. A significant decrease ($p<0.05$) in sEMG power spectrum MF for erector spinae muscle at the end of exercise compared to the initial level was found, whereas the knee extensor and flexor muscles revealed no significant changes in this parameter. The subjective rate of fatigue increased ($p<0.05$) moderately during the cycling exercise. The heart rate was stable during the exercise, remaining predominantly in the aerobic zone. After the exercise, MVC force was significantly ($p<0.05$) decreased compared to the pre-exercise level. It was concluded that based on sEMG power spectrum MF, 30-minute cycling exercise at constant intensity caused a marked fatigue of erector spinae muscle with no significant fatigue-induced changes in knee extensor and flexor muscles.

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FUNCTIONAL CONDITION MODEL OF LEG MUSCLES OF 1ST SPORT CLASS KETTLEBELL LIFTERS

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The aim of research was create optimal functional condition parametric model of leg muscles for the improvement of kettlebell lifter workout process. Taking as the foundation the analysis of special literature on kettlebell sport and summarizing different research data, was developed 1st Sport Class kettlebell lifter (weight category: 78 kg) functional condition parametric model of leg muscles. Developing 1st Sport Class kettlebell lifter (weight category: 78 kg) leg muscle functional condition model (table 1), was considered kettlebell lifting sport muscle topography (Ромашин, 1998, Тихонов, 2009). Taking into consideration the abovementioned statements, for the development of leg muscle functional condition model were used the results of steptest (diagnostic equipment "Master Screen CPX") and the results, shown in competition exercises (Latvian range real competitions).

Table 1

Functional condition model of leg muscles and results in competition exercises of 1st Sport Class kettlebell lifters (78 kg weight kategory) after steptest on the veloergometer (n=10)

Measurements		Results
Average power of leg I tipe muscles fiber in aerobic threshold	absolute (W)	132±4.2
	relative (W/kg)	1.9±0.08
Average leg I tipe and IIa tipe muscles fiber maximal power of oxidation process in anaerobic threshold	absolute (W)	213±3
	relative (W/kg)	3±0.1
Average maximal power of leg I tipe, Iia and IIb tipe muscles fiber	absolute (W)	293±4.1
	relative (W/kg)	4.1±0.1
Average results in competition exercise „kettlebell clean and jerk” (reps)		74.5 ± 4.8
Average results in competition exercise „kettlebell snatch” (reps)		140.4 ± 8.3

Since the execution of kettlebell sport exercises is carried out at the level of anaerobic threshold, characterized by large and sub-maximal power (Ромашин, 1998), and taken into consideration the last research correlation analysis, was concluded that one of the factors, limiting endurance, is athlete work capacity at the level of anaerobic threshold. In kettlebell lifting sport maximal power of oxidative processes of slow (type I) muscle fibers is of great importance: the higher it is, the higher rate of performing exercises can endure kettlebell lifter. Therefore, comparing different levels of athletes, as to the level of the power reached at anaerobic threshold can be made conclusions about maximal power of oxidative processes of slow (type I) and fast (type IIa) muscle fibers (Селуянов, 2000). For the control of functional condition and competition result predicting can be recommended steptest. The functional condition parameter model of leg muscles can be used in the selection process of young athletes and for the comparison of the individual model with higher-level athlete models.

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CARDIOVASCULAR AND RESPIRATORY SYSTEM PARAMETERS MODEL OF 1ST SPORT CLASS KETTLEBELL LIFTERS

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Introduction. One of the key criteria affecting endurance abilities, are cardiovascular and respiratory systems (Konrads, 2003). Athlete body functional abilities are determined by cardiac minute volume, heart rate under workload, oxygen consumption and other indicators. If the muscles are able to absorb more oxygen, they will be able to work with more power (Sjodin, 1985, Shave, 2006).

The aim of research was create optimal cardiovascular and respiratory system parametric model for the improvement of kettlebell lifter workout process. Taking into consideration the abovementioned statements, for the development of cardiovascular and respiratory system parametric model were used the results of load test on the veloergometer (diagnostic equipment "Master Screen CPX") and the results, shown in competition exercises (Latvian range real competitions).

The analysis of the correlation of physiological indicators of cardiovascular and respiratory systems with competition results in kettlebell sport showed that the closest correlation was observed at anaerobic threshold level. However in comparing different athlete cardiovascular and respiratory systems with the help of parametric model should be taken into account the indicators at aerobic and anaerobic thresholds, as well as maximum performance (table).

Table

Cardiovascular and respiratory system parameters model and results in competition exercises of 1st Sport Class kettlebell lifters (78 kg weight kategory) after load test (n=10)

Measurements	Results		
	aerobic (AeT) threshold	anaerobic (AnT) threshold	peak load
Average heart rate (beats/min)	121±2.1	158±2.6	191±0.8
Average heart minute capacity (l/min)	15.7±1.1	19.5±0.6	22.4±0.9
Average relative oxygen consumption (ml/min/kg)	22.8±1.2	35.4±2.1	50.5±2.3
Average results in competition exercise	„kettlebell clean and jerk" 74.5 ± 4.8 (reps)		
	„kettlebell snatch" 140.4 ± 8.3 (reps)		

In kettlebell sport maximum oxygen consumption should be taken into account, undergoing workload not longer than 3 minutes, because long activity above the anaerobic threshold is not possible. This assertion is especially true in long distances, covering which requires more than 3 minutes (Konrads, 2003). But in kettlebell sport is a team relay, in which team participant performs workload with submaximal power exactly 3 min, therefore maximum oxygen consumption and maximal work capacity is one of the factors in completing the team.

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FOREARM MUSCLES PARAMETERS MODEL PARAMETERS MODEL OF 1ST SPORT CLASS KETTLEBELL LIFTERS

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Introduction. One of the most topical problems in contemporary kettlebell lifting training process is the forearm and hand muscle workout. Having analyzing muscle topography during performing kettlebell lifting exercises in competitions, several authors (Шикунов, 2005) as the most important muscle group consider the forearm muscles.

The aim of research was create optimal forearm muscles parametric model for the improvement of kettlebell lifter workout process. Taking into consideration the abovementioned statements, for the development of forearm muscles parametric model were used the results of control exercise „hang on the bar", circumference sum of right and left forearm, handgrip strength sum of right and left hand and the results, shown in competition exercises (Latvian range real competitions). During the some researches, performing forearm anthropometric parameters, finger flexor and competition result correlation analysis, was found that higher anthropometry and maximum strength indicators do not correlate with higher competition results. In our researches 78 kg weight category athlete mean wrist dynamometry results mean value is about 50 kg, but mean bar hangs are around 4 minutes (table).

Table

Forearm muscles parameters model and results in competition exercises of 1st Sport Class kettlebell lifters (78 kg weight kategory) (n=10)

Measurements	Results
Control exercise „hang on the bar" (sek)	262±11.4
Circumference sum of right and left forearm (cm)	92.6±1.9
Handgrip strength sum of right and left hand (kg)	96.7±2.7
Average results in competition exercise „kettlebell clean and jerk" (reps)	74.5 ± 4.8
Average results in competition exercise „kettlebell snatch" (reps)	140.4 ± 8.3

Lower indicators of strength and rapidforce, showed by athletes, training their endurance, can be the result of weaker development of their muscle strength nerve components (Hakkinen, 1989). This conclusion can be justified with the help of the fact that in kettlebell sport time for performing exercises is 10 minutes, the and importance of forearm muscle maximum strength characteristics decreases, while the endurance importance of endurance characteristics increases. Can be drawn the conclusion that upon reaching definite level of palm maximal strength and forearm circumference, should be paid more attention forearm muscle specific endurance (i.e., to the development of forearm muscle mitochondrial system to improve maximum power of oxidative processes of slow type I and fast type IIa muscle fibers) (Мякинченко, 2005).

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TEST SYSTEM "OMEGA" FOR USE OF ATHLETES FUNCTIONAL ABILITY TO CONTROL YEAR-ROUND COMPETITION SEASON

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Introduction. Sports team coaches always have been interested in information about him to lead a team of players athletic abilities, and especially on their functional state. Such information allows the coaches to select the optimal composition of the team in specific competitions, players use game mode. But the sportsman shape is the very complex process, because it consists of a large number of parameters, which more or less impacts the player's performance. The physical condition of the athlete is treated as a training base. It hard to disagree, because without a good physical training players will be unable to adequately perform the techniques in actions, what makes playing conditions at high speed with active resistance. Athletes' physical structure is formed by several factors, such as their body's ability to adapt to the physical and emotional pressures, general conditioning, the body's energy supply options and spares. On the objective of the study were issues about how the season will change basketball players physical and functional shape and its component indicators, clarification.

Methods. The study was conducted with VEF Riga basketball team players who were tested with the program - the instrumental complex "Omega". Diagnostic systems "Omega C" provides the ability to control the quality of the restorative processes occurring in the body that ensures a balance between high load and preservation of health, significantly increase the effectiveness of training, to predict the achievement of peak fitness and maintain it throughout the competition period. Checks were seven times from August 2010 till March 2011 - once per month. Were identified which player's physical shape parameters have greatest impact on their current testing results of condition, adaptation of the loads general conditioning, level of energy.

Results. The obtained results are presented in percents from maximal possibilities of player. The percentage of players with the highest rates were for general conditioning - an average of 84% of the team; adaptive physical strain rates average 76% of the team, energy reserves and integrated forms of sports figures - 75% and 77%. Resistance index during the season: energy reserve ratios have remained within the limits of up to 26%. Large fluctuations in psycho - emotional status and in results of adaptation to physical load - 16 - 22%. The most stable indicators were of physical condition that changed only 5 - 11% an average. Based on the systematic control of the players and the results combined with the information of the exercise physical loads, coaches brings new opportunities to prepare teams for competitions and for optimal management of training process.

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PROMOTION OF BALANCE ABILITIES FOR SPORT CLIMBERS

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Introduction. Sport climbing has been included in programs of extracurricular activities in both the many European countries and the former republics of the Soviet Union (Morrison, Schöffl, 2007), moreover, sport climbing is included in programs of children and youth physical education in several countries (Morrison, Schöffl, 2007; Stiehl, Chase, 2007).

Several literature sources have pointed out that coordination and balance are crucially essential physical characteristics in sport climbing, but the importance of balance in climbing has not been proved experimentally as well as there are no comparisons of this ability with other physical skills a climber needs, e.g., overall coordination, vigour, endurance and rapidity; there is a little information on methods and measures for promoting balance abilities.

Aim of the research: theoretically develop scientifically grounded and sensory system-based combination of balance exercises and assess its contribution to promoting sport climbers' balance abilities.

Methods: research and analysis of scientific research literature sources; testing (testing of static balance abilities; testing of overall coordination and testing of proprioreceptive sensations); pedagogical experiment; determining experiment; mathematical statistic analysis. Participants of the research were sport climbers of various levels of preparedness aged 11- 16.

The creation of the set of measures for promoting balance abilities was based on 5 groups of sensory systems (see Table 3). 4 sensory systems (A – motions' or proprioceptive system, B – vestibular or balance system, C – skin system, D – ocular system) enable sport climbers to follow knowingly the performance of their motions and to follow changes in their body position in order to keep their balance, but the 5^{th} (E – auditory) sensory system promotes higher concentration abilities which are needed for keeping balance.

In order to promote balance abilities of sport climbers there was a set of measures for promoting balance abilities developed which consists of three groups of exercises:

1) Exercises to promote balance abilities (15);
2) Games and plays to promote balance abilities (14);
3) Exercises with a specific balance inventory to promote balance abilities (43).

Assessment of the contribution of the set of measures to promote balance abilities to promoting balance abilities in the participants of control group and experimental group of the pedagogical experiment led to the main conclusions that the set of measures for promoting balance abilities do promote balance abilities in sport climbers. Also assessment of the set of measures for promoting balance abilities based on the sensory system and the arithmetical mean results of the overall coordination test of participants of the experimental group were better results then of participants of the control group.

Base on the conclusions above, the positive effect of the developed set of measures for promoting balance abilities for sport climbers was proved.

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THE LIFESTYLE OF THE POLISH AND LATVIAN STUDENTS OF THE UNIVERSITIES OF PHYSICAL EDUCATION

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Introduction. Increasing physical activity is more and more often accompanied by an incorect lifestyle and health disorder (Paffenbarger et al. 1993). A man as a social being always lives and act in certain social structures as a family, university, member of local or global society. They are mainly responsible for some values which are certain for person, for his future model connected with lifestyle. During normal school term students are given compulsory physical education lessons, but that is not enough of a dose for correct psychophysical development of a young man (Eurobarometer 2010). One of this values, which has been worked out since university time is the attitude towards regular physical activity, nutrition habits and level of health state.

The purpose of this research was to diagnose the elements of lifestyle of University of Physical Education students in Biala Podlaska (Poland) and Latvian Academy of Sport Education in Riga (Latvia).

The research comprised 246 students of University of Physical Education and Sport in Biala Podlaska (Poland) and 92 of Latvian Academy of Sport Education in Riga (Latvia). The average age of respondents was (M= 20.27 years). The subjected were interviewed of questionnaire IPAQ (Sjöstrom et al. 2000), HBUSQ (Litwiniuk, Grants 2010) and Values of Schwartz.

The analysis of results shows that the attitude towards regular physical activity and health were similar. Most of students (79%) represented high level of physical fitness and practiced many of physical activities. Nutrition habits of the students regardless of the country differ greatly from the principles of rational nutrition. Nutrition assessment indicates an unbalanced diet, or excessive intake of some ingredients such as fats, and carbohydrates. The students do not differ clearly in their health behaviors from students of other universities. Noteworthy, however, a smaller percentage of smokers, especially among those with increased physical activity i.e. sportsmen. The obtained results unambiguously show the necessity of channeled health education during the conducting of curriculum physical exercises in every universities.

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DEVELOPMENT OF HIGHER SCIENCE OF SPORT IN LITHUANIA

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Introduction. Sport is a social phenomenon, an inseparable part of the society's culture and the system of preparation for competitions and participation therein in order to reach the best sport results. The science of sport is the system of scientific researches, studies and practice that develops new technologies and methods relevant for solution of problems of human move activity by integrating the achievements of other sciences (Poderys, Visagurskienė, 2004). The science of sport integrating the disciplines of the science of sport into the integral science is quite a young but intensively developing kind of science (Skurvydas, 2009). **Purpose**: to review the development of the higher science of sport in Lithuania.

Methods: analysis and generalization of sources of scientific literature.

The results. The science of sport as a separate trend of integral sciences only started forming in Lithuania in the XX century after winning the independence (Miškinis, Raslanas, Tubelis, 2008). A. Jurgelionis should be mentioned first (1894-1976) as he was the first to defend the doctor thesis on the topic „Some notes on physical education (its origin, present state and future). Moreover, the pre-war science of sport in Lithuania was developed by V. Augustauskas-Augustaitis, A. Vokietaitis, S. Darius, K. Savickas, K. Dineika, professors from Vilnius University Z. Žemaitis, V. Sezemanas, S. Kolupaila etc. (Gulbinas, Kuzmienė, 2006). Thus, the basics of the science of sport were formed and developed in the independent pre-war Lithuania. After the Second World War, on the 2nd of September 1945, the National Lithuanian Institute of Physical Education (NLIPE) was founded and the first scientific conference took place in 1947 (Miškinis, Raslanas, Tūbelis, 2008). From 1945 to 1980, three theses of a scientific doctor (habilitated doctor) and 22 ones of a candidate (doctor) were defended. In 1968, NLIPE started publishing the collection of scientific works „Kūno kultūra". In 1969, J.Skernevičius defended the thesis of a scientific candidate on the topic of students' sport. In 1980, the post-graduate studies started in NLIPE. In 1981, the first post-graduate student J. Poderys went to the post-graduate studies of NLIPE. In 1983, he defended the thesis of a candidate of biological sciences in Leningrad and in 1985, A.Vilkas defended the thesis on the topic of pupils' sport etc. In 1954, under the supervision of the teachers of NLIPE, Kostas Labanauskas and Juozas Kuprys, the first researches of sportspeople of high mastery were performed.
Presently, such problems of the science of sport are solved in Lithuanian Academy of Physical Education as Monitoring of athletes' training; Physical education, physical activity and health; Rehabilitation of the disabled and adapted physical activity; Sports physiology and motor control; Modelling and management of leisure sector in the context of global economy; KU solves problems of children's physical culture and health education and physical education of children with special needs; SU solves theoretical and methodical aspects of the improvement of education of children and students' physical culture and pupils' physical culture; LUES solves problems of the management of preparation of sportspeople of high mastery and efficiency of students' training and physical education; VU solves pedagogical, psychological and biological aspects of students' physical culture and sport. Lithuanian sport scientists keep in close touch with the International Council of the Science of Sport and Physical Culture, European College of the Science of Sport, International Council of Preparation of Coaches and other world scientific institutions. There is participation in different world forums, reports and seminars.

Conclusions. The science of sport is not constant and unchanging. This field of activity is a constantly changing process: old truths are checked and new knowledge is developed.

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THE EFFECTS OF KINESTHESIA, BALANCE, AGILITY AND STRENGTH TRAINING PROGRAMS AMONG PERSONS WITH SYMPTOMATIC KNEE OSTEOARTHRITIS: A PILOT STUDY

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Introduction. Symptomatic knee osteoarthritis (OA) is one of the most frequent causes of physical disability and pain among adults. Due to the prevalence of quadriceps weakness in persons with knee OA, leg strength training (ST) is commonly used in intervention programs. Some evidences suggests kinesthesia, balance and agility (KBA) techniques, that may result in more rapid symptom relief and functional improvements exercise.

The purpose of this study was to determine the effects of KBA, ST exercises and combination of KBA and ST training programs to improve isometric thigh muscles force and to improve function among persons with knee OA.

Nine participants (62±11 y), three in each group, were randomized to 8 weeks, 3-days per week home-based rehabilitation treatments in three groups: (1) KBA exercises only; (2) ST exercises only, (3) Combination of KBA and ST exercises. To assess function related to activities of daily living, we used functional tests: timed 10-stair climbing, 10-stair descent, “get up and go” 15 m walk and 30s “sit to stand” test. The quadriceps and hamstrings muscle force were assess using an isokinetic apparatus (Biodex System 3, USA), unilateral isometric knee extension torques at angle 60° and 90°, knee flexion torques at angle 40° and 90°. All measurements were done in every 4 weeks.

Physical function improved 40% with KBA and ST combination, 32% with KBA only and 49% with ST exercises only at 8 weeks. Thigh muscles force improved 18% with KBA and ST combination, 25% with KBA only and 51% with ST exercises at 8 weeks. All three interventions appear to improve physical function and thigh muscles force among persons with symptomatic knee OA.

This pilot study shows 8 weeks of home-based KBA only, ST only, and KBA and ST combination training programs have the potentional to improve physical function and thigh muscles force. Further studies with larger sample sizes are warranted to make sure which intervention is the most effective among persons with symptomatic knee OA.

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EFFECT OF TIME OF DAY ON CENTRAL AND PERIPHERAL FATIGUE DURING 2 MIN MAXIMAL VOLUNTARY CONTRACTIONS IN PERSONS WITH MULTIPLE SCLEROSIS: WOMEN VS MEN

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Introduction: The aim of this study was to evaluate the effect of time of day on central and peripheral fatigue during continuous 2-min maximal voluntary contractions of the quadriceps muscle in women and men with multiple sclerosis. The terms ‘‘peripheral fatigue” and ‘‘central fatigue” have been used to discriminate between these two possible sites of muscle fatigue. Fatigue is one of the most common symptoms of multiple sclerosis (MS) and can have a major impact on health-related quality of life. However, no universal consensus has been reached regarding a formal definition for fatigue, and its mechanisms and causes are not understood. Generally, fatigue in MS patients is measured using two techniques: (a) the subjective Fatigue Severity Scale and (b) assessment during exercise-induced peripheral and central fatigue. It has been established that MS patients experience more motor fatigue than healthy control subjects during sustained, repetitive contractions and ambulation.

Since continuous MVC presents advantages for the study of central and peripheral fatigue, we used a 2-min MVC protocol to study peripheral and central fatigue in the quadriceps muscles of healthy men and women and those with MS. Such protocol was applied in our previous research with MS, but in this study this protocol was used in the morning and in the evening. It is commonly accepted that many persons with multiple sclerosis report increased fatigue in the afternoon and in the evening compared to that in the morning. However, nobody has studied the changes in central and peripheral fatigue during physical exercise comparing the performance in the morning and in the evening, as well as its dependence on gender.

Methods: We studied age-matched (40–50-years of age) patients (men, n = 9; women, n = 9). The inclusion criteria for MS patients were a Kurtzke Expanded Disability Status Score < 4 and a Fatigue Severity Scale Score > 5. Experimental procedures: Isometric torque and electrical stimulation and 2 min. maximal voluntary contraction.

Discussion: At the end of a 2-min MVC, the voluntary torque decreased by about 65% in MS men and women (in the morning and in the evening), whereas TT-100 Hz decreased by about 26% and 38% in the morning, respectively in women and men and by 3% and 28% in evening. We established that even after 30-s MVC CAR decreased in women in the evening greater by about 25 % compared to the one in the morning. Besides, we observed that women’s CAR in the evening markedly decreased during the first 30 s, but in the period from the 30 s till the 120 s the changes in CAR were less than those in the morning. Ihe most interesting conclusion is that only for women central fatigue increases in the evening while their peripheral fatigue markedly decreases. However, it remains unclear why women’s central fatigue is greater in the evening than in the morning. It is well known that MS patients’ fatigue increases in the evening compared to that in the morning. To our knowledge, nobody has studied peripheral and central fatigue performing objective tests, and nobody has compared such results in the aspect of gender. As far as we know, MS women and men’s physical activity in the daytime was similar and it did not have any effect on our chosen protocol (2-min MVC). Thus, we do not have any doubts about the reliability of our main conclusion. Central fatigue increases (for women in the evening) and peripheral fatigue decreases because there was decreased muscle activation due to central failure, which resulted in a smaller metabolic demand and decreased fatigue of the muscle.

Conclusions: The effect of time of day on central and peripheral fatigue during 2-min maximal voluntary contraction in persons with multiple sclerosis is significant only for women.

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COACHING PECULIARITIES & FITNESS PROFILE OF YOUTH BASKETBALL PLAYERS AGED 7–17 YEARS OLD: CASE STUDY

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Introduction. Long-term Athlete Development (LTAD) outlines a staged appropriate training, competition and recovery programming in relation to the developmental age of the individual (Balyi, 2001; Balyi & Hamilton, 2004; Balyi & Williams, 2009). Scientific research has concluded that it takes eight-to-twelve years of training for a talented player to reach elite levels. This is called the ten-year or 10,000 hour rule, which translates to slightly more than three hours of practice daily for ten years (Ericsson & Charness, 1994, Balyi & Hamilton, 2004). *The aim of the research* was to compose physical and technical fitness normative profile and to identify the efficiently applied training programme for youth basketball players aged from 7 to 17 years.

Methods. Subjects: Basketball players aged 7–17 years (from 40 to 172 in each age category, overall – 1051 subjects) took part in the study. Descriptive data are presented as means ± standard deviation (*s*).

Results. *Body size alteration.* The greatest changes ($P < 0.001$) in height were assessed in the years of 12^{th} (5.4%) and 15^{th} (4.7%) compared to previous years, as in body mass – 12.6% and 13.7% respectively.

Physical & technical fitness. The power of leg muscles (SJ) increased the most ($P < 0.001$) in 12^{th} (12%) years, but CMJ in 9^{th} (14.3%). Speed increased ($P < 0.001$) in the years of 10^{th} (5.6%). The indices of *technical fitness* increased ($P < 0.05$) in such a way: 1 minute shooting (11^{th} – 23.2%), dribbling (13^{th} – 7.2%), movement (slide step) and free throw (15^{th} – 13.5% and 19.7% respectively).

Training program. Integral training prevailed through 7 to 17 years old players (39.5 ± 5.01%) in an annual plan. It was found two features of integral training. In the beginning to playing basketball integral training was applied less (33.7 ± 1.61% in the years between 7–10 years old) than in the years of 11–17 (42.8 ± 2.37%) old. Technical training decreased from 7 to 17 years (50–16%), but physical trainining increased (10–31%).

Discussion: Genotypic and and phenotypic factors might have influenced those results (Malina et al., 2004). Different changes in height and body mass of 11 and 12 year-old players might be affected by the juncture of pre-pubery and puberty. Increasing of SJ and CMJ, as well as technical fitness might be valuable factor for basketball coaches in order to design right training programs for improving specific fitness features for players for particular years (Balyi, 2001). The phenomenon of long-term basketball players development is: that training programmes for 7-to-9-year subjects are not classified related to annual periods; integral training prevailed through 7 to 17 years; the selection of the best players in "Sabonis' Basketball Centre" are classified from 9 years old.

Correlations between technical training in an annual plan and technical fitness test were large r=0.68–0.99. Correlations between height, arm sparm, body mass and SJ, CMJ, 20 m speed test were r=0.98–1.00.

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THE SIGNIFICANCE OF ADOLESCENTS EMPLOYING PHYSICAL SELF-EDUCATION PROCESS TOWARDS DEVELOPING OF PHYSICAL QUALITIES

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The aim of the research was to investigate the influence and impact of physical self-education process and development of physical qualities in first year gymnasium schoolboys.

Research methods: analysis of scientific literature, classical experiment, testing of physical qualities and statistical analysis.

Experimental group pupils, who were able to choose physical exercises from provided versions and invent their own exercises, developed weaker physical qualities; all this was implemented in 2 weekly lessons. Besides, this was recommended to be performed also in leisure time, at least once-twice times a week. Control group pupils undergone usual physical education lessons incorporating traditional physical qualities development means and methodic, sport games into lesson contents.

Research results. Schoolboys in the E group tended to show improvement in standing long jump. The obtained results of this test, after the second testing, showed growth of 0.038 m.

The development of functional strength in the experimental group with the flexed arm hang test showed a growth (d=6.398 s) during the school year and was statistically significant **(p<0.025)**.

Active flexibility in the adolescent (sitting and reaching) did not change statistically significant, (d=0.0075 m), nor did the standing balance (flamingo, d=1.09 N/60 s).

One skill of coordination abilities (three forward somersaults) became somewhat worse during the school year (d -0.21 s), while others (dribbling a ball with the right hand with obstacles) improved somewhat (d=0.35 s), and with the left hand respectively (d=0.63 s, **p<0.05)**.

Six of the seven tests from the K group showed the improvement.

Statistically, explosive strength (d=0.0218 m); functional strength (d=0.598 s); active flexibility (d=0.0001 m); coordination abilities (three forward somersaults, d=0.18 s); (dribbling a ball with the right hand around an obstacle, d=0.49 s) did not show significant improvement. Coordination abilities (dribbling a ball with the left hand around an obstacle) changed statistically significant (d=0.69 s, **p<0.05)**. The standing balance results after the school year were worse (d=0.19 N/60 s).

When the results of the physical qualities of the E and K groups were compared after the school year, it was determined that the final results were similar.

Conclusion. Primary and Basic Education General Programs (2008) includes the information on how pupils are doing progress to reach personal physical improvement. These are obtained in the autumn and during spring when performing the physical fitness tests. The test results generally show whether the pupil has made any personal progress. This information shows changes in the personal and physical fitness, and helps the pupil to understand his strong and weak sides. That is why in our one year duration research, the pupils from the experimental and control groups, while employing physical self-education process, strived for personal improvement, and were progressing with explosive and functional strength, active flexibility, and standing balance during physical education lessons and leisure time. It could have been influenced by personal physical education motives and goals, had the ability to choose the tasks, create personal physical exercise complex, its methodic and technique.

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EFFECT OF KINESIO TAPING ON LOWER BACK MUSCLE PAIN AFTER SKIING

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Cross-country skiing exercises most of the joints, muscles and tendons in the body giving the skier an all around workout. Low back pain is a common complaint among cross-country skiers. The Kinesio tape (KT) can be applied theoretically to any muscle or joint of the body (Kase et al., 2003). KT based on the functions of the tape improves the muscular function regulating the muscle tone, and can be useful in decrease of painful processes (Fu et al., 2008). Merino et al. (2011) is the unique study found about the subjective perception of the local pain using KT during sport practice, but they applied KT in triathlete's calves.

The Borg Scale CR10 is a category-ratio (CR) scale. It is a general intensity scale for most subjective magnitudes that can be used to measure exertion and pain.

Q **The aim** of the study was to evaluate the effect of KT on the local pain (low back) after the practice of ski in college students.

The results. Fifty five volunteer students from Latvian Academy of Sport Education (35 men aged 21.40 ± 0.60 years, body mass 80 ± 12.31 kg, height 182 ± 7.91 cm and 20 women aged 21.20 ± 0.52 years, body mass 65.77 ± 8.84 kg, height 171 ± 7.18 cm) participated in this study. The study was conducted according to the Helsinki Guidelines (2008). After 3 days of ski practical lessons during the winter camp, volunteers were randomly divided into 3 groups. One group was applied KT in the low back, another was applied placebo tape and the third group nothing. It was applied using the Y-shaped taping technique (Yoshida et al., 2007). Between 5 to 6 hours after the practice students were evaluated about perceived pain on low back muscle by Borg's scale CR10, before and after the application of KT in the low back muscles.

No significant differences were found in any of the 3 groups between pre and post taping on pain measured by visual-analogue pain scale (CR10). But the KT group showed the greatest decrease in perceived pain. Theoretically KT provokes a decrease of the perceived pain. But the results found in the different studies are contradictory.

Kim et al. (2002) in 43 patients with low back pain finds significant differences regarding the degree of pain between the KT group and the placebo taping group. Merino et al. (2011) applied KT in triathlete's calves during different competitions. None of them suffered cramps in the calf's muscles, and according to the scale CR10 the perceived pain was zero or not more than 2. The current research is lacking regarding the use of KT as a viable option for decrease perceived pain during the sport practice.

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COMPARATIVE ANALYSIS OF LEARNING SPEED AND ACCURACY MOVEMENTS FOR HEALTHY PERSONS AND PERSONS WITH MULTIPLE SCLEROSIS

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Introduction and implication of the research question. Probability learning theory suggests that repeating the same movements many times we learn the way the movement is performed with some degree of probability. We suppose that persons with multiple sclerosis learn speed and accuracy movements slower than healthy persons.

Research aim was to establish and compare the learning peculiarities of speed and accuracy movements for healthy persons and persons with multiple sclerosis performing a task – five sets of 20 repetitions.

Research methods. The sample of the research included 12 healthy persons and 10 persons with multiple sclerosis. The study was conducted using Dynamic Parameter Analyzer DPA-1 for arm and leg movements. The subjects performed the task with their right hand. During each task the subject set the handle symbol, 0.0035 m wide, at the start zone on the computer screen. The programme generated an audible signal every1-3 seconds, and at the same time the subject had to react and to push the handle so that he/she could hit the target. The cycle of measurement ended when the handle symbol hit the target.

Research results showed that multiple sclerosis had a significant effect ($p < 0.05$) on the average speed of movement (Va), maximal speed of movement (Vm), time to maximal speed (TVm), and time to target (Tv).

The research showed that MS persons performed the tasks with greater variability compared to healthy persons. The highest coefficients of variance for MS persons were observed in the indices of time to target (40.6–49.6 percent) and time to maximal speed (22.7–33.7 percent). The highest coefficients of variance for healthy persons were observed in the indices of maximal speed (22.8–28.1 percent).

Discussion and conclusions. Learning effect occurred in the course of the whole task, and it was the same for both persons with multiple sclerosis and healthy persons. Research results showed that learning dynamics was almost the same for persons with multiple sclerosis and healthy persons, but the indices of MS persons were worse, i.e. they performed movements slower and with greater variability compared to healthy persons.

Movement learning depends on two different processes – fast and slow learning. Fast learning process is characterized by fast learning and fast forgetting. Slow learning process is characterized by slow learning and slow forgetting (Ethier et al., 2008). In speed and accuracy tasks, children's accuracy improves at the expense of their speed, but for adults only the average speed of movement increases (Motiejūnaitė et al., 2011).

Researchers claim that it is difficult to reconcile the speed and accuracy of movements because when the movement is performed fast, its duration decreases, thus the possibilities of its correction decrease as well (Schmidt and Lee, 1999).

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HIGH PERFORMANCE WOMAN BMX CYCLIST'S PHYSICAL AND FUNCTIONAL CAPACITIES ALTERNATION DURING YEARLY TRAINING CYCLE

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Introduction. Bicycle motocross (BMX) event in cycling sport is very recent; International Olympic Committee included it into the list of Olympic sports in 2003 and in 2008 this event was on cycling events program of Beijing Olympic Games. Specific capabilities are needed in such format competitions (Campillo et al., 2007; Herman et al., 2009). Cowell et al. (2011) indicate high muscle power in short-term work to be essential for athletes of this cycling event and which is only lower than analogical power of 200 m sprint event track cyclists. Anaerobic-glycolytic energy producing way is also highly significant because of its considerable input to energetic during such short-term work (Hodgins et al., 2001; Herman et al., 2009). For such reason training of BMX women cyclists has to be purposefully directed to developing characteristics specifically needed for this sport (Mateo et al., 2011). High performance bicycle motocross athlete, who successfully participates in most international competitions, has been recently trained in Lithuania. Road and track cyclists' training and main characteristics of their organism adaptation to physical loads do not lack researchers' attention in foreign as well as in Lithuanian scientific publications but yet there is a lack of information on BMX cyclists' training.

Consequently, it is relevant to reveal the main characteristics of Lithuanian high performance international class women cyclist's physical and functional capacities alternation, which would further lead to improvement of women cyclists' training process for this event.

Research aim – to reveal characteristics of Lithuanian high performance woman BMX cyclist's physical and functional capacities indices and their alteration during yearly training cycle; to compare them with analogical data of other cycling events athletes.

Methods. Research of Lithuanian BMX women cyclist (A) had been organized during years 2010-2011. Researches were implemented during these yearly cycle periods: preparatory (I), competition (II), and transitional (III). Physical development and muscle power, in various energy producing zones were established. Efficiency of anaerobic alactatic energy producing mechanisms was measured after establishing single muscle contraction power (SMCP) with ergometer step test and anaerobic alactic muscle power (AAMP) with 10-s test on veloergometer. Maximum anaerobic alactatic-glycolytic capacity (MAAGC) with applied 30-s test on veloergometer (Wingate test) and blood lactate (La) concentration were also established. Functional capacity of blood circulation and respiratory system was evaluated under pulse rate at rest, its rate alteration after standard physical load, and after one minute recovery.

Indices of BMX women cyclist's physical and functional capacities were compared to analogical results of woman sprint track cyclist - 200 m event World champion (B), and woman track cyclist - 3 km pursue race event World championship bronze winner (C).

Research results showed that women BMX cyclist's body mass, muscle and fat mass fluctuated in considerably decreasing way from preparedness to competition period during yearly cycle. Our analyzed BMX cyclist's SMCP is very high – 32.2 W/kg and exceeds the same index of other various specialization analyzed cyclists, however AAMP (16.8 W/kg) and mixed anaerobic alactic-glycolytic muscle power (9.6 W/kg) indices are insignificantly lower than analogical indices of one of the best World track sprinter. Elite cyclist's (C), whose part of energy during competition period is produced in aerobic way, functional capacity of blood circulation system is the highest and these indices of our analyzed BMX cyclist are lower than aerobic capacity of cyclist C.

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REPEATED ECCENTRIC CONTRACTIONS INDUCE A PROGRESSIVE INCREASE IN CREATINE KINASE LEAK FROM THE ISOLATED SOLEUS MUSCLE

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Introduction. Increased activity of creatine kinase (CK) in serum is often used as an indicator of muscle damage after exercise (1). However, it is not clear what factors are responsible for this CK leak from skeletal muscles, as cells of immune system might also contribute to the secondary muscle damage after exercise (2). An *in vitro* model of muscle exercise permits assessment of the role of muscle contraction independently of the systemic factors an thus exclude the influence of the immune system. **The aim** of the study was to investigate the time course of changes in force output and CK leak from isolated mouse muscles during repeated eccentric contractions.

Both solei were dissected from hindlimbs of ~ 6 month old C57BL/6J mice and placed in the Tyrode solution (121 mM NaCl, 5 mM KCl mM, 0.5 mM $MgCl_2$, 1.8 mM $CaCl_2$, 0.4 mM NaH_2PO_4, 0.1 mM NaEDTA, 24 mM $NaHCO_3$, 5.5 mM glucose, 0.2% (weight/volume) bovine serum albumin) that was bubbled with 95 % O_2-5 % CO_2 (pH 7.4) at room temperature (21-23°C) as previously described (3). One of the solei was fixed in the *in vitro* muscle test system (1200A, Aurora Sci., Canada) for repeated stimulation while the other muscle remained in the same solution and served as a control. For the exercised muscle, optimal muscle length (L_0) was initially determined using stepwise increments in muscle length and 1-s tetani at 150 Hz. Afterwards, the muscle was subjected to 100 repeated eccentric contractions. The contractions were produced once every 10 s by 1.1 s electrical stimulation at 150 Hz including muscle stretching to 30% above the optimal length over 0.2 s. The rate of increase in CK activity (nkat/h) of the Tyrode solution was measured over 30 min either after 20 (n=5) or 100 (n=6) eccentric contractions using the standard biochemical analyser (Spotchem EZ, Arkray, Japan).

Peak isometric force (P_0) decreased to 35.1 ± 3.5 % (mean ± SD) of initial value after 20 eccentric contractions and to 5.2 ± 3.1 % of initial force after 100 contractions, respectively. The rate of increase in CK activity in the media was higher after 100 contraction compared to 20 contractions (10.0 ± 2.6 nkat/h and 5.3 ± 2.2 nkat/h, $p < 0.05$). This demonstrates that initial 20 contractions induced approximately the same increase in CK leak from the muscles as the remaining 80 contractions. However, there was no correlation between CK leak and muscle force. Thus, CK leak and muscle force are determined by different factors during this type of exercise.

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COMPLEXITY OF THE TASK INTERFACE WITH MOTIVATIONS FOR LEARNING FAST AND ACCURATE MOVEMENTS

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Introduction. An important factor affecting the learning process and outcomes is the motivation - what gives students the energy, pays any direction to their behavior (Пилоян, Суханов, 2000). Depending on what grounds a person promoting something works, it is the business process or its outcome can cause satisfaction or, conversely, frustration (Rupšienė, 2000). Therefore, this study was to reveal the complexity of the task interface with motivation to learn fast and accurate movements.

Materials and methods. 45 subjects were divided into three groups - control (C), the standard of learning (SL), and dynamic learning (DL) after 15 people (age 21.6 ± 1.2). Subjects were learning to perform rapid and accurate movements with machine DPA-1. The SL group subjects learned fast and accurate movements, the target appears in the same location on the screen, DL group subjects learned fast and accurate movements of the target appear in different screen locations. SL and DL groups, subjects performed 10 training exercises every 2-3 day. All groups of subjects before and after training exercises they perform the testing completed *The Activity Motivation Questionnaire* made by K. Zamfir methodology (Реан, Коломинский, 1999). The study analyzed data of descriptive and analytical statistical methods of analysis in Microsoft Excel 2010 ® kit.

Results. It was found that all groups – C, SL and DL - learning in subjects prior to movement of internal activity motivation was stronger compared with the external positive or negative motivation. There was no statistically significant ($p > 0.05$) differences between the groups. But II testing after the questionnaire survey showed that the C group was an internal movement of learning motivation was significantly lower ($p<0.05$) than in SL and DL groups. II testing in the control group subjects does not significantly ($p<0.05$) increase in the external positive motivation, SL and DL groups of subjects - the internal motor learning motivation. The results confirm L. Rupšienė (2000) findings that the learning period, the inner motives are much more valuable then activity motivation an external. It is likely that most participants in the experimental groups learning activities were interesting and enjoyable, they enjoyed the training exercises, and their nature. This coincides with R. Malinauskas (2010), the claim made by the internally motivated person to join in activities at both the future of their results as due to the fact that he is the most interesting and enjoyable activities. R. Martens (1999) view, internally motivated people to goals such as excellence, relevance, success and achievement is a reward in itself. II testing showed no statistically significant ($p>0.05$) differences between the SL and DL groups, suggesting that movements in learning activities outside of the motivation for the task complexity.

Conclusions. Not a significant ($p>0.05$) correlation between task difficulty and motivation for learning activities fast and accurate movements. Subjects were more internal than external expressed motivation for action regardless of the complexity of the task.

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VIRAL MARKETING COMMUNICATION CHANNELSAPPLICABILITY POSSIBILITIES IN LITHUANIAN TOURISM ENTERPRISES

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Introduction. Advancements of internet and technology have given us a new electronic communication form – viral marketing (VM). VM is a form of word-of-mouth communication in which individuals are encouraged to pass on promotional messages within their social networks (Bampo et al., 2008). M. Bumblys (2007) who says that, the idea to create such a marketing environment that individuals influence each others, it is very important for all marketing communications.VM has become an important influence on consumers product evaluation (Xavier & Summer, 2009). A number of marketing campaigns are conducted through a VM, achieving the benefits such as low budget and great reach of message (Etrati et al,2010).

Purpose - identify VM communication channels applicability possibilities in Lithuanian tourism enterprises.

Research question - which of VM communication channels are not fully used in Lithuanian tourism enterprises.

The objectives of the study are: to identify VM operating system. To define VM definition. To identify VM communication channels. To analyze and to compare perception and reaction to VM communication channels of internet users and Lithuanian tourism enterprises. We identify how is operating VM system: VM is starting of spreading promotional message to persons, which provokes emotions, and encouraged to communicate and distribute message through social networks. We analyzed VM definitions from 1999-2008 in science publicities and we chose the best characteristics to describe VM and we made our definition. VM - promotional message similar as virus, has potential for exponential growth, which encouraged voluntarily information distribution peer to peer. We identify that VM has the main 6 communication channels: e-mails, videos, blogs, social networking sites, forums, internet games.

Research: the research of VM communication channels applicability possibilities in Lithuanian tourism enterprises and made researches of two aspects. One of those were internet users and another the employees of tourism enterprises. We made quantitative research with internet questionnaire for internet users and quality research^ made by interview for the employees of tourism enterprises. Research was made between December - January months in 2010. Quantitative research lasted 4 weeks, quality research - 6 weeks. We investigated 251 internet users and employees from 7 Lithuanian tourism enterprises. Afterwards we explored perception and reaction to VM communication channels by compared the data of the internet users and Lithuanian tourism enterprises.

Findings - e-mails and social networks sites are applicable and effectively using communication channels. We found that videos and forums communication channels have potential to expand because are the most applicable for internet users, but the least using in Lithuanian tourism enterprises. Blogs and internet games are the least applicable, because internet users do not trust the information in these communication channels.

Limitations and Future Research: we explored just communication channels applicability possibilities in Lithuanian tourism enterprises, but we did not explore the way how VM can be effectively used. We found that videos and forums communication channels have potential to expand. The next researches can be focus of exploring characteristics of these channels.

Keywords: marketing, viral marketing, internet word-of-mouth., internet communication channels, tourism.

APPLICATION OF THE INTEGRATED MARKETING COMMUNICATION FOR RAISING AWARENESS OF EDUCATIONAL PROGRAMS FOR LEARNERS IN LITHUANIAN MUSEUMS

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Relevance and problem of the article. For modern museums to succeed in the market, the continuous marketing communication process is essential. In the countries with developed market economies, this aspect of the museums' activities place an increasingly significant role displacing individual, often random marketing communications tools, such as single advertising in the press, TV spot coverages, fragmentary reports on public educational programs in museums etc. With increasing competition, museums inevitably must learn to coordinate, integrate, plan their communication activities, i.e. to use integrated marketing communication (IMC). A. Bakanauskas (2004), says that IMC is marketing communication, where all the support complex elements are integrated into a single coordinated whole intended for the target customer and are treated as a set of interrelated marketing tools that complement each other. Over the last decade, the IMC grew in popularity and currently it is considered one of the biggest marketing innovations, but IMC is not yet applied in the museums of Lithuania to raise awareness of educational programs for learners.

Object of research - the application of integrated marketing communication by raising the awareness of educational programs for learners in Lithuanian museums.

Aim of research - to find out why the integrated marketing communication is not the light in Lithuanian museums to raise awareness of educational programs for learners.

Research methods: while writing the article we first became familiar with the scientific literature on marketing communications, its structure, clarified the concept of IMC, characteristics and the planning process and analysed the educational programs for learners offered by the Lithuanian museums. Afterwards we carried out an empirical study, attempting to reveal the reasons for application/non-application of the IMC in the Lithuanian museums for raising awareness of educational programs for learners. In spring 2011, we conducted a qualitative research – interview (interviewed 9 staff members of the Lithuanian museums directly responsible for the marketing activities in the museums) which demonstrated that the IMC is not yet applied in the Lithuanian museums to raise awareness of educational programs for learners. Most of, information about the educational programs offered by the museums for learners reaches the target users only through one or more of the promotion complex elements without merging them into a single coordinated whole. The quantitative study - survey carried out in February 2012 (including the questionnaire of 24 questions, an e-mail interview of 128 museum employees) showed that museums do not carry out a regular environmental survey and its analysis, they do not have clearly set objectives of the organization and the unified messaging method and their assessment, they have limited budget, and not very well-formed communication complex. Some respondents noted that museums have no marketing specialists and marketing work is being sporadic. It should be noted that there were museums, whose staff did not even know what the marketing communication is, and even more so the IMC.

Conclusions: given the lack of funds and qualified professionals to carry out the IMC, we would suggest the museums to unite and delegate the IMC to a newly established B2C office, which would be not responsible for the promotion of educational programs in the museums, but also would do so professionally.

Key words: marketing communication, integrated marketing communications, educational programs, museums, Lithuania.

THE EXPECTATIONS OF PARTICIPANTS AND VISITORS OF EXHIBITIONS IN THE CONTEXT OF INTERNATIONAL TRADE FAIR OF TOURISM, SPORT AND LEISURE "VIVATTUR 2012"

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Introduction. By market conditions, many companies, eager for competitiveness and survival, are looking for new solutions in marketing, sales and other areas. Exhibitions are one of many ways to inform about new products, to enhance your company's reputation, to attract new customers, to increase sales, and so on; therefore, most companies participate in various exhibitions with expectations that meet their goals. Visitors of the exhibition also have their own expectations. Knowing expectations of both participants and visitors is important for the organizers of exhibition, because they should constantly check if their marketing decisions meet with the expectations of customers (participants and visitors), for it is as important as new technologies, professional personnel training, etc. All this suits for the organizers of tourism exhibitions, because satisfied customers' expectations ensure the viability of the exhibition.

Research problem: What are the expectations of participants and visitors of trade fair?

The aim: to find out the expectations of participants and visitors of trade fair "Vivattur 2012".

Methodology of the research. Analysis of the literature has shown that researchers give different definitions of expectations. Researchers, investigating behaviour, define expectations as series of potential effects, which highlights what could, might, will or would have been better happened (Rust R.T., Zabor A.J., Winningham T.L., 1996). Rust R.T. and others (1996) identify several different types of expectations: predictable, expected and ideal. Predictable expectations – expectations of the average quality level, which is predictable based on all the information. Expected expectations - a situation when customers feel that something belongs to them under the agreement. Ideal expectations - the expectations, what would happen to the best circumstances. Most scientists believe that our customers' expectations are influenced by social, economic and demographic factors. The most commonly socio-economic status is defined by business, income, education level, living conditions, prestige in society. (Don Hellriegel, John W. Slocum, jr., 1992).

A qualitative research has been selected for empirical research. It was conducted on 2-4 March 2012, data was received using semi-structured interview method. Participants and visitors were interviewed during trade fair "Vivattur 2012", recording conversations by dictaphone.

The results: the research has showed that participants had expected to see a large flow of interested customers, but compared to previous years or other international exhibitions - visitors were relatively few. They negatively evaluated the fact that participants were very few too, and this could have a negative impact on the flow of visitors. Advertising of the trade fair was not qualitative, and advertising offensive was started too late, it was original, "the same as ten years ago, despite the fact that everything changes." The participants indicated that the trade fair did not meet their expectations: "…the next year I'm not going to participate, I can spend the money for advertising in the other way." What is more, the time for the exhibition was negatively evaluated due to the overlapping with the popular event - Kaziukas Fair,

which “took a lot of visitors.” “A lot of visitors came, who only sought gapeseed, did not know what they want, just swept everything from the tables….” Some participants identified that participated in the exhibition because they wanted to see what competitors offer or to sign cooperation agreements.

Visitors, who have visited the exhibition, can be divided into two groups: targeted visitors and occasional visitors. The first group of visitors were satisfied with the exhibition, which identified themselves as “I came to buy travel with discount, and I got all, I am satisfied”, “... I picked much material, I could read, update my knowledge, form the route myself…”, “… I met a lot of friends, talked to them, in other words, I had a great time...”, “very nice people were standing in stand area, offered everything, even to us they managed to suggest much interests…, before we thought that there is no more places to visit in Lithuania.” The second group of visitors came from the trade fair disappointed, because “... only few competitions were organized”, “… discounts were too small”, “... few participants, I do not understand for what I had to buy ticket.”

Conclusions: participants and visitors of trade fair “Vivattur 2012” evaluated the advertising and the organization of the exhibition negatively.

Keywords: expectations, visitors of exhibition, participants of exhibition, tourism, Lithuania.

PHYSICAL STATUS CHANGES OF SKILLFUL BASKETBALL PLAYERS DURING PREPARATORY PERIOD

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Sports training of great mastery basketball players in the preparatory period is a very complicated process which has specific peculiarities. The main goals of this period are to achieve optimal working capacity and prepare athletes to competition. In this period huge physical loads are overcame thus it is very important to get informative and operative rates on athlete's status changes.

The problem of research. Sports scientists (Bompa, 1999: Čepulėnas, 2004; Skurvydas, 2008; Верхощанский,1985; Платонов, 2004) discuss on what criteria should the reference be made in optimizing practice loads? The registration and analysis of daily status of athletes could be very salutary to the coach. Sports scientists confirm that athlete's status can be reflected in such indicators: the feeling of fatigue, desire to go in for sport, sleep quality, duration of sleep, falling asleep, appetite, general sensitivity to the environment, body mass and changes of body mass index. However, too little attention is paid to a thorough analysis of everyday physical status indicators of the athletes.

The aim of the research. To explore the rate of physical conditions and practice also, competition load connections of great mastery basketball players in the preparatory period.

Pedagogical observation research method was employed. The training loads of highly skilled basketball players (n=16) have been recorded according to a prepared monitoring protocol for six weeks. In accordance with the prepared self-monitoring protocol of physical state, every day the basketball players registered 9 physical status indicators. The indicators of the results of the competitions have been registered from the data of technical protocols. Later the correlations between the indicators of the training loads, competitions activities and status was searched.

Findings:

1. Physical load, the regeneration rate after exercise, sleep duration and sleep quality as well as the quality of falling asleep have impact on athlete's physical fitness status and competition results.
2. During the research period the basketball players' body weight decreased from 95.4±0.28 kg to 93.83±0.14kg. Basketball players gave 3.86±0.3 points to sleep quality. Sleep quality improved at the end of the preparatory period when the volume of training tools was reduced and the focus was on the speed of basketball specific-movements performance.
3. Falling asleep limits the athlete's quality of sleep, duration of sleep and sleep efficiency. During the research period the basketball players evaluated the falling asleep indicator by giving 3.75±0.31 points. Falling asleep indicator received the highest evaluation in the first preparatory- control micro-cycle, i.e. – 4.13±0.18 points.
4. The adaptation of the basketball players to physical load was rather difficult. During the research period the athletes rated their fatigue in 3.38±0.43 points. The closest correlation was recorded between the efficiency of competition activities ratio and the quality of falling asleep (r =0.28) and sleep quality (r =0.21) and motivation to go in for sports (r =0.20).

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NEUROMUSCULAR FATIGUE AND DISCOMFORT IN FEMALE SALES WORKERS

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Musculoskeletal disorders (MSD) are a major cause of work-related disability [1]. It has been suggested that working long time in standing or sitting position causes MSD [2]. Long-time standing is often associated with musculoskeletal problems, in including discomfort, fatigue and pain affecting the lower limbs, and low back, often in the whole body. People who have to stand up for a long time can suffer more serious health problems such as lower limb swelling and blood flow restriction [3]. Working in sitting position consumes less muscle force, but this body posture causes low back pain, muscle tension, and muscle pain. Constant sitting affects mostly the neck and lower back region [4].

The aim of this study was to assess neuromuscular fatigue and discomfort following workday in groups of sales workers, who were working predominantly in standing or sitting position. Ten female sales workers (aged 21-66 yrs), who worked predominantly in standing position (ST) and nine female sales workers (aged 20-54 yrs), who worked predominantly in sitting position (SI) participated in this study. Neuromuscular fatigue and discomfort immediately after the workday was subjectively evaluated by 10-point visual analogue scale (VAS) in neck, shoulder, low-back and leg regions. Visual-motor coordination was assessed by Grooved Pegboard test and hand grip strength for both arms was tested by hand dynamometer before and after the workday. Means and standard errors (±SE) of mean were calculated and the differences of the means of the groups were evaluated on the basis of the Mann–Whitney U-test. In ST group, the subjectively evaluated neuromuscular fatigue and discomfort by VAS in shoulder region was on an average by 47% lower ($p<0.05$) than in SI group. Significant discomfort and fatigue was established in calf posterior muscles in ST group compared to SI group. In the present study subjectively evaluated neuromuscular fatigue and discomfort by VAS in calf region of ST group were by 50% higher ($p<0.05$) than in SI group. In standing position the lower extremities are more loaded than in sitting position, where the most loaded body regions are in shoulders and neck. At the end of the workday, no significant differences between ST and SI group were observed in neuromuscular fatigue and discomfort evaluated by VAS in neck, low back, anterior and posterior thigh, and anterior calf in this study. Before the workday, the Grooved Pegboard test time was shorter in SI group. The visual-motor coordination time was significantly shorter ($p<0.01$) after the workday was as compared to before workday in ST group. Thus, visual-motor coordination was improved following the workday in both groups. Before the workday, hand grip strength for the right arm was higher on an average by 29% ($p<0.05$) in ST group compared to SI group, whereas no significant between-group differences were established after the workday. The hand grip strength was stabilized in female sales workers, and arms were not fatigued. No significant work-related changes were found in Grooved Pegboard test time and hand grip strength in the measured groups. It was concluded that following the workday, subjectively evaluated neuromuscular fatigue and discomfort was more pronounced in ST group in posterior calf region and in SI group in shoulder muscles. No significant fatigue-induced changes in visual-motor coordination and in voluntary isometric force-generation capacity of hand muscles were established in female sales workers following the workday.

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LOADS INTENSITY IN SEMI-PROFESSIONAL FEMALE TEAM–HANDBALL DURING PREPARATION PERIOD

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Introduction. Base done the analysis of the game it is clear that the training of the players should focus on improving their ability to perform intense exercise and to recover rapidly from periods of high-intensity exercise (Ziv & Lidor, 2009; Michalsik et al., 2011). The *aim* of the present study was to determine the variation of intensity during preparation period in semi-professional female team handball.

Methods. Semi-professional female handball players (n=14) (age – 21.4 ± 2.7; height – 1.77 ± 0.56m; body mass – 69.5 ± 9.8kg) of a Lithuanian handball club (winners of silver and bronze medals of the Lithuanian championships in the years 2006, 2007, 2008, 2009) were involved in research.

Intensity. The heart rate (HR) was recorded in a period of five-second using a "Polar Team System" (Finland). Participants performed a incremental treadmill test to exhaustion to determine their maximum heart rate, maximum blood lactate concentration, VO_{2max}, as well as their maximal aerobic speed and their individual lactate threshold.

Results. The mean intensity during the handball training (10 sessions) represents %68,3 ± 4 HR_{max} (range 61–75.6). The mean intensity during the friendly handball matches (3 match) was %88.1 ± 0.3 HR_{max}. In the ten training sessions analysed, the mean HR was 134 ± 6 beats min^{-1} (range 121–143) and during a match 173.2 ± 1.4 beats $\cdot min^{-1}$. HR distribution during a match was used in such a way – under aerobic threshold – 22.6 %, between first and second ventilation thresholds – 62.9 % and over blood lactate accumulation threshold – 14.5 %.

Discussion. The mean HR (during a match) recorded in the present study corresponded to %88,1HR_{max} i.e. was almost the same than the values reported in elite female modern handball (86% and 85 % HR_{max} Manchado and Platen, 2008 and Lidor and Ziv, 2009 respectively). In male handball %HR_{max} between 80% and 88% were recorded by Cardinale and Manzi (2002). The mean intensity during the handball training was 20% less of HR_{max} than during a matches-play. The mean intensity during the training varied and the highest was during a friendly matches-play. It has been reported that in team sports during a game the HR vary according to playing standard and players' physical fitness (Rodriguez-Alonzo *et al.*, 2003).

These results demonstrate that %HRmax does not depend on players skills level and on the competition level, it is more conditioned by the game specific. These results demonstrate the importance of a high aerobic performance in semi-profesional female handball and training should be conducted according to the specific demands.

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INFLUENCE OF NORDIC WALKING TRAINING ON PHYSICAL ENDURANCE IN ELDERLY WOMEN

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Introduction: Together with prolonging human life, economic growth and higher social expectations, there is also need for developing science studies on the influence of health training on the prevention of ageing processes in elderly people. Care of good level of endurance is one of the main factor that guarantees both health and high quality of life for millions of elderly people (Ossowski, et. al., 2007). When analyzing training programs for endurance improvement growing scientists' attention of Nordic Walking Training (NW) can be observed. Professional literature shows much discrepancies on the field of obtained results between maximal oxygen uptake during NW training and march without poles on a treadmill (Schiffer et. al., 2006; Morgulec-Adamowicz, Marszałek, Jagustyn, 2011). On the contrary, there are many science research proved effectiveness of NW training as a form of rehabilitation, especially on the cardiology field, for patients after acute coronary syndromes and heart attack (Oka et. al., 2000; Kocur et. al., 2009).**The aim** of this article was to determine the changes of endurance level under Nordic Walking training in women aged 60-75 years.

Material and methods: 65 women aged 60-75 years were the subject of this study. Women were divided into 2 groups: control group (26 people) and experimental group (39 people). Women from experimental group were taking part in Nordic Walking Training for 15 weeks, 2 times a week. Intensity of march was measured with a use of Polar Sporttesters devices. To determine the level of endurance, Cooper's march test for 2000 meters was applied.

Results: Improvement of endurance under recreation Nordic Walking training was confirmed. Results of 2000 m march was better of 49.1 sek. Result was statistically significant on the level of $p<0.05$. A little regress of endurance in women not taking part in training was observed.

Discussion: The results of the researches held in Kaunas, where 41 volunteers were taking part (11 men and 30 women aged 65+/- 5 years) showed positive influence of Nordic Walking on aerobic endurance (Sokeliene, Cesnaitiene, 2011). Present studies held on larger group of subjects (just women aged 60-75 years) with the use of other research tool proved significant improvement of endurance in march test. Other scientists observed that regular Nordic Walking training (8-13 weeks) in women gave increase of high density lipoprotein, reduction of total cholesterol level, low density lipoprotein, triglycerides and BMI (Hagner et. al., 2009) and resulted in increase of maximal oxygen uptake (Kukkonen-Harjula et. al., 2007). But no significant differences in biochemical and physiological ratios between NW and march without poles were observed.

Research should be continued to elaborate effective loads in Nordic Walking training for younger women too.

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CHILDREN LIVING IN FOSTER HOME AND FAMILIES: THE INFLUENCE OF PHYSICAL ACTIVITY FOR PSYCHOSOCIAL FACTORS

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Research shows that young people living in foster homes are particularly vulnerable social group and have more risk to misbehaviors (Wheal, 2002; cit. pagal Našlaičių ir tėvų globos netekusių vaikų savarankiško gyvenimo įgūdžių ugdymo programa, 2007). Difficulties in social adaptation, inability to make positive and lasting relations with others, the lack of stress coping skills are influenced by undeveloped sense of affectionate, unfavorable development conditions, negative social experiences gained in childhood. We believe that children living in foster homes need a help to develop their personal qualities and social skills that facilitate the social adaptation. One of the most affordable areas of education could be physical activity, because physical activity more than other school subjects reveal human behavior and emotional aspects. Different researches public different studies about social impact of physical activity: 1) physical activity is a holistic factor of human development itself; 2) the benefits of physical activity depend on teaching methods are used in physical education and how it is socially organized (Telama, 1999).

The aim of the research was to investigate and to compare some differences of psychosocial factors between participating and not participating in sport youngsters living in foster homes and families.

Methods of the research and : 1) Questionnaire about quality of life and readiness for independent living; 2) Test using standardized questionnaire BASC – 2 *(Behavior Assessment System for Children, Second Edition)* „Self-Report Scales Report“ (12-21 ages) **(***Reynolds C.R., komphaus R.W. (2005).*

Participants of the research: The study involved 716 12 - 19 years old persons (47 % females and 53 % males) living in foster home from 32 state, municipal and private institutions from all over Lithuania. The same interview was made with 908 persons of the same age (56.6 % females and 43.3 % males) living in their biological families.

The research results and discussion: The analysis of the data showed that the level of sense of inadequacy significantly higher of youngest living in foster homes than in biological families. There are no significant differences between youngsters participating and not participating in sport in both groups. More difficulties in interpersonal relationships have youngsters living in foster homes (42 % female and 47 % male) in comparison with those living in biological families (32 % female and about 37 % male). There are no significant differences between participating and not participating in sport in both groups. The results of the research showed that the self-esteem is higher of girls living in foster home than one’s in biological families. Meanwhile, self-esteem is lower of boys living in foster home than those living in families. However, self-esteem level significantly higher of youngsters participating in sport than not participating (χ^2= 25.492 (df=4); $p<0.05$). It was found that social stress level not significantly higher of youngsters living in foster home. In general, social stress level significantly lower of youngsters participating in sport in comparyson with not participated one’s (χ^2= 10.248 (df=4); $p<0.05$).

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"SPORT IS THE BASIS FOR EVERYTHING ELSE": PEOPLE WITH SPINAL CORD INJURY SHARE THEIR PHYSICAL ACTIVITY EXPERIENCE

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People with physical disabilities, including people with spinal cord injury (SCI), are often physically inactive. This may restrict their functional independence and increase the risk for chronic diseases and secondary complications. Furthermore, physical activity (PA) may help to re-establish a positive identity after SCI. In order to promote and implement a physically active lifestyle among this population, it is vital to explore their thoughts and experiences about PA. With this in mind, this study sought to explore the PA experience of people with spinal cord injury (SCI).

Study participants were found using a snowball sampling method. Semi-structured interviews were carried out with 8 participants from different parts of Estonia (all male, mean age 31 years, wheelchair users for an average of 7 years). Interviews were tape-recorded, transcribed and thematically analyzed. In addition to interviews, PA was assessed with the Physical Activity Scale for Individuals with Physical Disabilities (PASIPD).

First, all participants reported being physically active prior to injury. However, the mean PASIPD score post-injury was 14.56 ± 11.36 MET hr/d (mean±SD) which is rather low compared to other studies carried out among people with physical disabilities, for example 20.2 MET hr/d in a study by Washburn *et al.* (2002). Despite their relatively low activity levels, all participants found PA to be an important part of their lives and had regular positive experiences with physiotherapy. Nevertheless, their independent activity levels varied greatly: some participated in competitive sports, some exercised independently but not regularly, and PA experiences of some participants were limited to physiotherapy.

Second, participants were motivated by several perceived benefits of PA: provides more functional independence, forms the basis for other activities (e.g., working, sitting for a long time, writing on the computer), promotes general well-being (feeling stronger), provides positive emotions, improves sleep, reduces stress, prevents complications (contractures), and reduces negative symptoms (spasticity, intestinal problems). Those who participated in competitive sports said that it promotes their self-esteem and also provides a social aspect to their lives. Overall, PA promotes physical self-efficacy, improves everyday functioning and prevents secondary complications.

Third, many constraining factors to PA were identified: lack of financial resources, problems with transportation and accessibility to sports facilities, health problems, pain, lack of motivation, need for assistance (e.g., if a person is unable to transfer independently), lack of time, spasticity, lack of suitable sports to participate in, and functional limitations (associated with the level of injury, e.g., weak/no grip). The participants identified function- and health-related barriers to PA in addition to motivational and socio-environmental barriers.

In conclusion, participants were motivated to participate in PA due to different perceived benefits but they identified several constraining factors, demonstrated also by their modest PASIPD scores, which might hinder their social inclusion if not addressed. It is essential to remove the socio-environmental barriers and thereby increase accessibility to PA. Creating more possibilities for being physically active is the prerequisite for tackling motivational, function- and health-related issues. The heterogeneity of the PA experience of people with SCI should also be taken into consideration, that is, there is no single facilitator or barrier, but rather a unique combination of different factors which justifies the use of a holistic, individual and client-centred approach. This aspect (if affirmed by further research) should be taken into account in PA promotion among people with SCI.

The strength of this study lies in its qualitative approach to the PA experience of people with SCI and practical implications for adapted PA specialists, physiotherapists and coaches. However, due to the limited number of participants no generalizations can be made. Hence, further work should explore if these findings apply to a larger group of people with SCI.

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AGE-RELATED CHANGES IN QUADRICEPS FEMORIS MUSCLE MITOCHONDRIAL METABOLISM IN WOMEN: ASSOCIATION WITH MUSCLE MASS AND CONTRACTILE FUNCTION

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Aging is associated with marked decline in neuromuscular function. Age-related sarcopenia is often defined as loss of muscle mass, strength, and contractile function (quality). Mitochondria regulate cellular bioenergetics and have been implicated in aging. However, it remains unclear whether age-related sarcopenia is associated with reduced mitochondrial respiration. The aim of the present study was to examine age-related changes in skeletal muscle mitochondrial respiration capacity in women in association with muscle mass, strength and fatigability. Eight healthy old (aged 69-81 yrs) and 8 young (aged 20-26 yrs) women volunteered to participate in this study. Muscle biopsies from the vastus lateralis (VL) of the quadriceps femoris (QF) muscle were obtained by a transcutaneous conchotome biopsy method. Oxygraphic method was used for measurements of mitochondrial ADP-stimulated respiration rates (rate of oxidative phosphorylation) in permeabilized muscle fibres, in the presence of different substrates (Vg - glutamate/malate for registration of the complex I dependent respiration; Vs - succinate with rotenone for registration of the complex II dependent respiration, and Vc - TMPD and ascorbate for registration of cytochrome oxidase dependent respiration). Total volume and cross-sectional area (CSA, at 40% length from patella) of the QF muscle, and volume and CSA of the VL muscle were measured by magnetic resonance imaging. Isometric voluntary contraction (MVC) torque and peak torque of electrically evoked twitch of the QF muscle were assessed by custom-made dynamometer. Fatigue index (FI) of the QF muscle was calculated as electrically induced twitch peak torque immediately after the end of the endurance test (50% MVC till exhaustion) as a percentage of the value before the endurance test. Old women had reduced ($p<0.05$) Vg and Vc (28% and 34%, respectively) compared with young women, whereas no significant age-related changes was suggested in Vs. Old women had also lower ($p<0.05$) total volume and MVC torque of the QF muscle, and volume of the VL muscle. Twitch peak torque, CSA of the QF and VL muscle, and FI and endurance test time did not differ significantly in the measured groups. In old women, Vg correlated positively ($p<0.05$) with CSA of the QF muscle ($r=0.76$) and VL muscle ($r=0.76$), whereas in young women, Vg/Vs correlated positively ($p<0.05$) with CSA and total volume of the QF muscle ($r=0.78$ and $r=0.75$, respectively). In conclusion, this study indicated that aging is characterized by markedly reduced skeletal muscle capasity of oxidative phosphorylation. This property may stem from diminished tissue content of mitochondria together with defect in complex I of the respiratory chain. The capacity of mitochondria to synthesize ATP seems to be an important determinant of muscle mass.

POSTURAL EFFECTS ON BLOOD-PRESSURE AND CALF MUSCLE TONE IN SPINAL CORD INJURIED PEOPLE

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Following spinal cord injury part of sympathetic nervous system is disrupted from the brain stem control, thus results in cardiovascular system regulation disorders. Impaired cardiovascular regulation may cause orthostatic hypotension or other negative impacts on persons' health. However, there exist adaptive mechanisms, which may change cardiovascular regulation and compensate these cardiovascular disorders. One of the mechanisms that may affect the occurrence of orthostatic hypotension may be changes in muscle tone after spinal cord injury.

The aim of research – to ascertain postural effects on blood pressure and calf muscle tone in persons with spinal cord injury through orthostatic test.

Methods. The study included a control group (n=14) and two groups of people with disabilities (paraplegia, n=14, and tetraplegia, n=7).

During passive orthostatic test (*this test includes a passive posture change from horizontal to vertical position, which is performed using a tilt-table*) non-invasive blood pressure was continuously oscillometric, automatically measured using the vital signs tracking monitor and calf muscle tone measurement was performed using myotonometer.

The data was processed by personal computer using Microsoft Excel program. The arithmetic mean and standard deviation; comparison between groups was tested by student's t-test (significance level $p < 0.05$); correlation between changes of muscle tone and blood pressure in the three groups determined by Pearson correlation coefficient.

Results. Systolic blood pressure (SBP) data analysis shows that in the control group rates are stable and within normal range, dynamics of blood pressure is even. Results differ in disabled groups: in paraplegics group SBP is elevated, but within the normal range and SBP dynamics can be characterized as uneven. In tetraplegia group SBP change are most significant - after shift to the standing position, SBP rapidly and significantly reduces. From the analysis of diastolic blood pressure results it's seen that obtained data is substantially similar as the SBP.

After performed myotonometric test of the leg muscle during orthostatic test we see that in the control group the calf muscles are more relaxed than in the other experimental groups - sensor penetration reaches 11.5 mm, while in the disabled groups the maximum penetration of the sensor is up to 8.2 mm. It is worth noting that muscles in tetraplegia subjects are more relaxed than in paraplegia, although most of tetraplegisc have increased muscle tone (spasticity). The differences between the control group and two disabled groups are statistically significant ($p < 0.05$).

Discussion. In study SBP response to orthostatic stress in tetraplegia group decreased significantly compared with the control group and two participants (tetraplegics) experienced orthostatic hypotension. These results confirm the findings of other authors in tetraplegics' orthostatic hypotension. Changes in muscle tone in tetraplegia group affects blood pressure during the transition from lying to standing position (correlation coefficient - 0.52 and – 0.41). Although these relationships are not strong, but they imply that the muscle pump activity is very important in case of tetraplegia to maintain a constant BP in the standing position.

Conclusions:

1. Blood pressure varies differently among control and disabled groups. Characteristics of blood pressure fluctuations during body position changes in paraplegics are similar to those of reactions as in able-bodied controls, while in tetraplegia case, possibilities of homeostatic blood pressure compensation during body posture changes are significantly reduced.
2. Findings that tetraplegics' blood pressure decreases rapidly and significantly in orthostasis suggest that passive standing does not have a positive effect on blood pressure control.

PHYSIOLOGICAL CHARACTERISTICS OF FUNCTIONAL STATE OF CRANIOCERVICAL REGION.

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In studies of phisiological processes in different parts of body mainly are discussed parameters characterising one or some vital functions. Regulatory processes and its disturbances in craniocervical region are very important for understanding reasons which could cause dysfunction or pain in this region. In this study there is made an attempt to analyse exchanged stance parameters, force disbalanss of craniocervical deep flexors and extensors and tacking in account our previous study results of skeletal muscle local blood flow regulation during static voluntary contractions discuss a question about possible blood supply of craniocervical deep flexors and extensors.

In this investigation stage participate 25 LASE students in age 20 -23. We evaluate maximal voluntary contraction forces (MVC) of muscles realising head flexion and extension in craniocervical junction in three head positions – neutral, forward nodded head and head backwards. There was used electronic dynamometer – The Lafayete Manual Muscle Test System, mod.01163. The head forward position in sagital plain was measured with ruler. Control of cervical vertebra position was performed manually. During stance control we find that average head forward position from body vertical axis in sagital plain was 0.055±0.002 m. Nobody of participants of this investigation have ideally normal head and neck posture. Comparing these results with literature we could assume that everybody have some problems with craniocervical flexors which support maintaining normal cervical lordosis. The posture when in sagital plain a head is shifted forward from body vertical axis causes extension position of C0-C1 joint. In this position according our measurements head flexors become twice weaker neither extensors. In this situation deep head flexors could not maintain normal neck lordosis and head is shifted forward and motion segments in cervical region could be impaired. From literature it is known that every 0.075 m shift of head forward twofold increases torque which mast be maintained by deep craniocervical muscles. From our previously investigations it is shown that only during 10% of MVC muscles could be supplied with adequate blood flow. It means that during posture with head shift forward essentially blood flow supply could become a factor causing functional weakness of deep craniocervical muscle therefore impearing cervical motion segments.

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BODY DISSATISFACTION AND UNHEALTHY WEIGHT CONTROL BEHAVIOR AMONG ATHLETES AND NON-ATHLETES TEENAGERS. DO THEY NEED EDUCATION?

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Introduction. Athletes are one of population that frequently engages in weight control behavior. It has been reported that sports with an emphasis on aesthetics, a lean body build, and sports with weight classes have higher incidences of participants with eating disorder symptoms (Sundgot-Borgen, 2004) and worse weight control behavior (Turocy et al., 2011). The association of the use of products or weight loss behavior to improve appearance with media influences, body dissatisfaction, and participation in sports is not well understood. To assess these associations, we conducted a cross-sectional analysis. Therefore, the aim of our study was to examine associations between sports activity, media influences, body dissatisfaction (BD), risk of eating disorders (ED), unhealthy weight loss behavior (UWLB) and unhealthy exercising behavior (UEB) in the sample of 11th graders.

Methods. 805 adolescents (mean age –17.23 (0.6) years, 476 (58.9%) females, 233 (28.9%) athletes) filled anonymous questionnaire, which consisted of *Sociocultural attitudes towards appearance scale* (SATAQ-3, Thompson et al., 2004), *Body areas satisfaction scale* from MBSRQ-AS (Cash, Pruzinsky, 2004), *EAT-26* (Garner et al., 1982) and specially for this study created *Weight loss behavior scale.*

Results. Although majority (75.5%) of students had optimal BMI, only 54 (6.9%) were overweight, but 43.1% wanted to lose weight. 38,2% of teenagers reported using at least one UWLB and 16% – UEB. Female athletes and non-athletes more than male students from both groups selected higher scores for UWLB ($p<0.05$), but with no difference in UEB. Media influence didn't differ between groups, but non-athletes were more dissatisfied with their body ($p<0.05$), had worse weight loss behavior ($p<0.05$), although teenagers participated in sports demonstrated worse exercising behavior ($p<0.05$). 87 adolescent (6.7% boys and 13.9% girls, $p<0.05$) subsumed into ED risk group with no differences between athletes and non-athletes ($p>0.05$). In both group we found significant correlation between all variables: higher media influence were related with higher BD, UWLB, UEB and risk of ED ($p<0.05$). Students participated in aesthetical sports (aerobics, gymnastic, dance) had worse body weight control behavior ($p<0.05$) and higher risk of ED ($p<0.05$) as students from body combat sport – worse with weight loss related exercising behavior ($p>0.05$).

Discussion. Modification of body build is often attempted via diet and exercise, so data were also gathered on attitudes toward eating and weight control – exercising behavior. Results of our study revealed that teenagers trust in body weight control technique from media and have poor understanding about dosage of PA and exercising behavior related to weight loss program. It is recommended that more research be undertaken to examine the role of coaches, teachers and peers in the development of BD, weight control behavior and disordered eating.

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DYNAMICS OF CONCATENATION BETWEEN INDICES OF ARTERIAL BLOOD PRESURE AND CARDIAC OUTPUT UNDER CONDITIONS OF INCREASING FATIGUE

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Introduction. It is well known that major portion of cardiac outputs during exercising is diverted to the working muscles but potential mechanisms through which muscle perfusion is altered during prolonged exercise are not fully understood [1]. The aim of the research was find out the peculiarities in concatenation between central and peripheral cardiovacaular indices under conditions of increasing fatigue.

Methods. The participants (n=39) of the study underwent a 50W increase in workload every 6 minutes and they exercised unless distressing cardiovascular symptoms supervened. The cardiac output were measured with tetrapolar chest rheography and blood flow in the calf was determined by venous occlusion plethysmography. Indirect arterial blood pressure (ABP) measurements were taken from the arm with a sphygmomanometer and standard-size arm cuff. Dynamics of concatenation of registered indices was made by use a method based on matrix theory proposed by Lithuanian scientists [2].

The initial data for analysis of concatenation between parameters was the normalized values of registered parameters. The parameters were interpolated using cubic splines, then discriminants of all investigated relationships were defined. If discriminants of matrices become near to zero then matrices from idempotent become to nilpotent, i.e. concatenation comes close to maximal and conversely.

Results and Discussion. The main finding of this study was that the regular and everlasting changes of concatenation between registered indices started at onset of exercising. This type of changes was observed during some stages of workload and reaching some functional state (fatigue) the increase or decrease of concatenation has changed in an opposite direction. The other important finding in this study was that peripheral changes, i.e. decrease of diastolic ABP has an increasingly important role for muscular blood flow under conditions of increasing fatigue. In our previous study [3] and in studies of others [2] was shown that relative steady state could be observed during the first stages of step-wise incremental increase of exercising intensity while the duration of exercising at each step of exercising was 6 minutes.

Conclusions

1. Dynamics of concatenation between cardiac output and ABP indices under conditions of increasing fatigue does not follow the dynamics of measured physiological indices, i.e. there no relative steady-states even during the first stages of workload, it has a constant tendency to change and only with reaches some functional state (fatigue) an opposite direction of these changes has a constant tendency again.
2. Under conditions of increasing fatigue the changes of diastolic ABP has an important role in peripheral blood supply. i.e. the concatenation between diastolic ABP and cardiac output during exercising has increased.

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RELATIONSHIP BETWEEN WHOLE BODY BONE MINERAL DENSITY AND LEPTIN IN RHYTHMIC GYMNASTS BEFORE PUBERTY

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Prepubertal time period is very sensitive period for bone mineral accumulation in children, which is influenced by genetic potential, endocrine status, nutritional factors, body composition and physical activity. Regular high impact weight-bearing physical activity during growth and maturation plays an important role in maximizing bone mineral mass gain [1]. Leptin concentrations have been related to fat mass (FM) and bone mineral density (BMD) values in healthy lean prepubertal girls [2], while the impact of lowered leptin concentrations on bone mass acquisition in the presence of elevated energy expenditure and reduced FM remains questionable in prepubertal and pubertal female rhythmic gymnasts [3].

To our best knowledge, no studies have been conducted to longitudinally examine the possible role of leptin at the same time on the development of BMD in a specific group of physically active prepubertal girls. The aim was to study relationships between change of whole body (WB) bone mineral density and baseline leptin level over 12-month in prepubertal rhythmic gymnasts (RG) and same age untrained controls (UC).

68 7-9-year-old girls (RG n=33; UC n=35) from Estonia were studied. All RG were recruited from local training groups and had trained usually 10-12 hrs per week for the past 2 years before starting the study. Participation only in school's physical education classes was inclusion criteria for UC. Whole body BMD was measured by dual-energy X-ray absorptiometry. Venous blood samples were drawn in both years between 7:30 and 8:30 AM after an overnight fasting from an antecubital vein.

WB BMD (+3.4%) was significantly increased ($P<0.05$) but no changes ($P>0.05$) in leptin levels were observed over 12-month study period in RG. In controls, significant increases ($P<0.05$) in WB BMD (+3.6%) and also leptin (+22.0%) were observed. Relationship between changes in WB BMD with leptin level was not significant ($P>0.05$) in RG. Increases in WB BMD were significantly correlated with leptin UC.

Leptin levels did not predict normal growth in WB BMD as a result of 12-month study-period in RG. These results suggest that specific physical activity pattern seen in prepubertal RG may have a beneficial effect on bone mineralization and may have counterbalanced the negative factors on bone development such as low fat mass and decreased plasma leptin concentrations.

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THE PECULIARITIES OF PSYCHOMOTOR REACTION AND ARMS OWN MOTION SPEED OF THE BASKETBALL PLAYERS

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Introduction. Basketball skills – ball passing, shooting, dribbling are based on multiplex coordination of movement and specific physical fitness. It's important to know the most limited factors in the preparation of basketball players and what the correlation of the individual indicators is. **The aim** of the present study was to assess speed of psychomotor reaction and arm own motion speed during the pass of basketball players.

Basketball player's physical fitness was evaluated by comparing them with physically active people. The sample consisted of 12 players (age 20.1±1.8 years) of the Lithuanian basketball 2nd division team who trained 6 times per week and play two matches. It has also been investigated physically active group of 15 people (age 21.3±0.9years). We used a modified movement speed test (Skernevicius et al., 2004) using original game ball.

Physical capacity were studied to assessing: muscle single contraction power (MSCP) (Bosco et al, 1983), anaerobic alactic muscle power (AAMP) (Margaria et al.,1966), 10 second cycle ergometer test were employed (Telford et al. 1989) (ergometer "*Monark Ergomedic 894 Ea"*), 10 s finger tapping test and arm grip test. Correlation analysis was performed to find the arm own motion speed links with indicators of physical fitness.

We have found that simple psychomotor reaction time of basketball players was 164.78 mls. Compared with physically active group the result was significantly better ($p<0.001$). The reaction to the stimulus of light and arms own motion speed of basketball players and group physically active people was not statistically different ($p>0.05$). Therefore a study shows that basketball players are able to quickly respond to visual stimuli but their motion speed does not differ from physically active people. Both psychomotor reaction time (V = 6.19 %) and motion speed (V = 11.36 %) featured a small dispersion around the average. We found that there are no statistical differences ($p>0.05$) between the capacities of muscle function: jump height, take off and MSCP in two groups. The dispersion of all these indicators of basketball players and physically active group is low.

Investigated an average of anaerobic alactic muscle power of basketball players is 26.19 W/kg. It is marked by very low dispersion (SD=3.79), which represents only 6.28 % coefficient of variation. The dispersion area of this indicator is large (Min=18.92; Max=31.37). Statistically significant differences between groups were not.

The study showed that hand motion speed has a weak correlation ($r=0.402$; $p<0.05$) with leg muscle contraction speed.

Arms own motion speed and psychomotor reaction time has no correlation with muscle power and muscle strength. This indicates the specificity of training and help to choose the direction. Arms own motion speed test has no correlation with tapping test.

We found that the main indicators of physical fitness of basketball players do not differ from untrained but physically active people. This may be one of the main factors counteract their progress and opportunities to play at a higher level.

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SPORT SERVICE QUALITY EVALUATION AT BASKETBALL SCHOOLS IN KAUNAS

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Relevance of the research. Environmental changes in sport sector epitomize a constant process which determines the dynamics of quality perception. Therefore, quality enhancement is a continuous process, which is optimal only if particular conditions are met: specific strategies and programs have to be provided. The constant control of customer satisfaction or dissatisfaction with service quality helps to determine deviations from the desirable quality level, and indicates action-imperative scopes. Consequently, the continuous evaluation of sport service quality is vital for contemporary sport organizations while retaining existing and attracting new customers.

The aim of the research is to evaluate sport service quality at basketball schools in Kaunas.

Methods. The research was provided using methods of systematic literature analysis, logical analysis, methods of comparison and generalization. Scientific background was composed of researches provided by Lithuanian and foreign authors. Quantitative data were collected by adapting SERVQUAL methodology to sport service field. The research questionnaire was composed of 25 statements fitting the model. Statements were adapted from the researches made by Parasuraman et al (1988) and Ramseook-Munhurrun et al (2010). For the evaluation of sport service quality, 7-point Likert type scale was used. The research results were calculated for expected and obtained service quality separately.

Sport service quality evaluation model (for the substantiation of model's elaboration see Pilelienė, Šimkus, 2010) used for the research, encompasses three main principles: a service provider, which provides sport service to a consumer; quality dimensions (tangibility, reliability, competence, sensitivity, empathy), which are used as a basis for service quality evaluation in SERVQUAL methodology; and one of the fundamental principles of total service quality management – continuous perfection.

Considering its' objective and subjective dimensions, service quality can be called as hardly definable topic. Objective quality can be related to external measurable dimensions. Calculations, data, mistakes, shortages, time wastes, expenditures, etc. reinforce the objectivity. However, when service affects customer imagination, personal experiences, emotions, expectations or attitudes, the quality is evaluated subjectively. The other important thing concerning service quality is that it can be evaluated only during the encounter; services (as opposed to goods) are experiential products.

Results and discussion. According to survey results, both levels of customer expectations and obtained service quality are similar. Questionnaire statements' evaluations for expected service quality vary between 4.17 and 6.67 points; whereas obtained sport service quality was evaluated between 4.25 and 5.75 points.

According to research results it can be stated, that sport service quality was best in Tangibility dimension (obtained service was evaluated 0.15 point better than expected); basketball schools in Kaunas possess equipment and infrastructure which can delight their customers by exceeding their expectations. However, supreme shortages showed up in subjective dimensions: Empathy (-0.25 points) and Competence (-0.34 points).

After analysing of research results it can be stated that basketball schools in Kaunas are failing in fulfilling their customer expectations. Contact personnel lack expertise and skills of interpersonal communication, psychological knowledge. Most shortages were observed in personnel's courtesy, friendliness, carefulness, and individual attention to a customer.

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LITHUANIAN TRAVEL AGENCIES' E-SERVICE QUALITY ASSESSEMENT

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Relevance of the research. It is widely acknowledged that e-business development becomes an important impact factor for country's economy. E-business abolishes distances and frontiers, helps in reaching a wider spread of customers, suppliers, and intermediaries. E-business encompasses more than ordinary and habitual business operations; modern, virtual environment-adapted business models emerge. Considering travel industry, internet becomes one of the main information sources for travellers. Information abundance, rapidity, cheapness, simplicity of order processing, and purchase after working hours or from home possibilities are being named as major skills of e-commerce. But is this e-business as good as regular when we talk about quality standards? The aim of the research is to assess Lithuanian travel agencies' e-service quality.

Methods. The research was provided using methods of systematic literature analysis, logical analysis, methods of comparison and generalization. Scientific background was composed of researches provided by Lithuanian and foreign authors. Qualitative research was provided using mystery buyer research method; quantitative data were collected by adapted E-QUAL methodology. The research was provided with 26 websites of Lithuanian travel agencies. E-service quality can be defined in terms of purchase and delivery of products and services. Service quality is one of the fundamental drivers, which helps organizations to compete in e-business environment (Mekovec et al, 2007). Main factors of e-service quality are: fast access, security, ease of navigation, well-organized search engines, clearly indicated ways of payment. Plenty of e-business models can be found in scientific literature; majority of them are adapted in practice. Some scholars do not provide clear classification system in their researches (Hirakubo, Friedman, 2002; Cordoso, 2005); others provide models based on various variables: income, lifestyle, scope of activities, main skills, etc. (Batagan et al, 2009; Ho, Lee, 2007; Iliachenko, 2006).

After performing an in-depth analysis of scientific literature, the model encompassing all the main purchase-related aspects was composed for further research. Applying Aladwani model the initial attitude to a travel agency's website is formulated – this determines the choice of a website. E-Qual and Webqual models help in prosecution of further analysis (services are provided, possible methods of payment, the speed of reaction, handling of communication with customer, work of navigation in a website, ease of finding necessary information). After adaption of these models, the attitude to a website and service quality (determinant a purchase decision) is composed.

Results and discussion. Research results revealed that e-service quality varies from 'good' to 'very bad' across travel agencies. One common problem was highlighted – Lithuanian travel agencies were incapable to adapt any travel offering to foreign customers; target customers appeared to be only people living/staying in Lithuania. Travel agencies should constantly provide inspections of their web-based activities, adapting mystery buyer researches for failure detection a improvement of services. Adapting travel offerings to foreign customers is vital in constantly intensifying competitive conditions. Latter improvement would be useful for the agency and its' customers.

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COMPLEX SYSTEM APPROACH IN TESTING AND MANAGEMENT OF ELITE ATHLETES TRAINING: LITHUANIAN MODEL

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Introduction. The essence of management of sport training is to have a feedback on induced changes in athlete's body. This paper presents the review of practical experience and special assessments of adaptive changes of Lithuanian elite athletes during the training.

Methods. Regular testing procedures of Lithuanian elite athletes in laboratory of Kinesiology of Lithuanian Academy of Physical Education started at 2001. Various tests and methods was used and adapted for these purposes. The most valuable approach was a complex system approach. We used the model of integral evaluation of the body functioning during exercise, which integrates indices of three functional elements: P – performance system; R – regulation system; S – supplying system. Relation between these systems can be specified various parameters, and we used the parameters of ECG and arterial blood pressure in order to handle the problems of sports training.

Results and Discussion. The analysis of obtained results during the regular assessments of functional state of elite athletes showed that both, i.e. heuristic assessment of registered indices and complex system approaches are useful for outlining the functional body changes. The methods based on dynamic complex system approach claims as additional and sometimes alternative methods and tools able to capture the qualitative changes produced during motor actions. The nonlinear dynamics framework offers the chance to study such changes and allows the emergence of new ways of optimizing the training process. We conclude that the assessment of inter parameter concatenation provides a new perspectives. The idea of a two-way effect is essential in the concept of interaction between two or more objects performing effect upon one another. The lasts development of mathematical instruments designed for assessment of inter parameter concatenation provides such possibilities. The methodology of evaluation of concatenation between various processes was suggested by Lithuanian scientists. The analysis of two numeric time series processes is presented when values of elements are determined.

The results of special assessment of concatenation between various cardiovascular indices by use a new methodology of evaluation revealed that the dynamics of concatenation strongly depends on the nature of processes. Functional state and the individual abilities to tolerate the various intensities of exercising can be evaluated by using this methodology. Regular assessment of functional state of athletes and analysis of the results based on complex model, which integrates the main functional systems, enables to reveal inter-parameter relationships and allows detecting new features of body's fatigability obtained during exercising. The analytical method applied for the assessment of physiological system interactions in different fractal levels by ECG parameters monitoring and its data sequences analysis. The dynamics of inter-parametric concatenation provide new approach of data sequences analysis and propose usefulness of the analytical methods in the field of complex systems in life sciences.

Conclusions:

1. Wide range of individual variations in character of adaptive changes in body is a feature of exercise training of elite athletes. The fine tuning of body systems and within the physiological system is the desirable consequence of training.
2. Complex dynamic system approach gives an original perspective and new the possibilities to keep a close look on individual adaptive changes of the athletes and is useful for management of training process even in various environmental conditions.

EFFECT OF INTENSIVE TRAINING PROGRAM ON WHEELCHAIR BASKETBALL PLAYERS

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Introduction. Athletes with SCI perform with their upper body, which limits their maximal exercise capacity and puts them at a disadvantage compared with leg exercise in terms of mechanical efficiency and physiological adaptations to exercise (Theisen, 2011). The two most important components of physical capacity are peak oxygen and power output (Haisma et al., 2006). In the current study, peak oxygen uptake and peak power output are studied as the prime outcome parameters of upper body training exercise in wheelchair basketball payers. It is very important for future research to perform training studies with a high methodological quality in the field of upper body training in people with spinal cord injury. In study focused on effects of intensive training program protocol which consist of wheelchair basketball trainings and wheelchair exercise trainings. Objective: To investigate the effects of an intensive training program on wheelchair basketball players.

Methods: 14 wheelchair basketball players were examined. The players were divided into the following two groups: experimental 8 players and control 6 players. Experimental group performed intensive trainings two weeks in Therapy and recreation center in Monciskes. Players performed two trainings in a day: one wheelchair basketball training and one wheelchair exercise training. The control group didn't perform intensive trainings. Before and after two week intensive trainings wheelchair basketball players performed continuously increasing exercise test on the ergometer "Ergoline 800".

Results: The post training of experimental group in the study showed a significant improvement in VO_{2peak} and PO_{peak}: pre- training VO_{2peak} was 2,3±0,16 l/min, post-training VO_{2peak} was 2,53±0,2 l/min ($p<0.05$); pre- training PO_{peak} was 141,75±14,23 W, post- training PO_{peak} was 181,63±9,3 W ($p<0.05$). The post training of control group in the study didn't show a significant improvement in VO_{2peak} and PO_{peak}.

Discussion: The intensive trainings intervention has a positive effect on the physical capacity as reflected by the improvement in VO_{2peak} and PO_{peak}. Attendance of the wheelchair basketball players at the training sessions was outstanding. All of our players completed the training. The program was perfectly tolerated by the subjects without excessive fatigue or shoulder pain. This two weeks intensive training program in wheelchair basketball players has demonstrated that everyday intensive training program, with two different trainings in a day is effective in the increasing physical capacity. Training program might be added to wheelchair basketball trainings program if the objective is to reduce the physical capacity of wheelchair basketball players. Actual progress in training program allows for observing gains in significant increases in maximal tolerated power and VO_{2peak}. Each parameter may involve considerable improvements in mechanical efficiency in wheelchair basketball game.

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ANTHROPOMETRIC CHARACTERISTICS AND PERFORMANCE OF LATVIAN MALE AMATEUR LEVEL HANDBALL PLAYERS

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Introduction. Mean height and weight increase is observed in international level handball players during the last 20 - 30 years [1]. They are great height athletes with hypertrophied skeletal muscles. Handball players need high levels of muscle power to achieve a fast running speed, powerful jumping and ball throwing. This is proved by the fact that the maximal power, produced by arm muscles in a heavy weight horizontal bar press from supine position does not differ significantly between the handball players and weight lifters [2]. An aerobic capacity also should be important to maintain high performance level of the athletes throughout all the game [1, 3].

The aim of our investigation is to determine anthropometric and performance characteristics in Latvian male young amateur level handball players.

Eleven 19 - 21 year old male players trained in handball from ten to 14 years five times per week and playing regularly in weekends from the team of Latvian Academy of Sports Education (LASE) voluntary participated in the investigation. A vertical jump height is measured on a special platform (PD – 3A, Russia). The throwing speed of the ball was measured by a reflected light method (EDV – Beratung Arbeiter, Germany). The aerobic capacity of handball players is measured on a treadmill, the intensity of running increased step by step. The oxygen uptake and heart rate are measured during the test by equipment "Viasys Healthcare" GMBH (Germany). The lactic acid level in the plasma is detected in periphery blood samples by special strips (Biosen 5030, EKF – diagnostic, Germany).

The height and weight of our handball players correspond with these characteristics in amateur players, table 1. Our athletes are 2 – 4 cm shorter and have approximately 10 kg less weight in comparison with the professional level handball players. This can be explained by greater skeletal muscles mass in International level athletes. The vertical jump height and maximal ball throwing speed in LASE athletes coincide with the data of Spanish amateur and professional players.

Table

Comparison of anthropometric and performance characteristics in Latvian amateur and foreign professional and amateur level handball players

Characteristics	LASE players	Amateur level players		professional level players	
		France [3]	Spain [1]	France [3]	Spain [1]
Height, cm	186.7± 8.1	177.0± 1.4	183.8±7.0	190.0± 1.2	188.7±8.0
Body weight, kg	85 ±11	74 ± 2	82 ± 10	79 ± 1	95 ± 13
Squat jump height, cm	47.5 ± 7.0	-	46.9± 7.0	-	46.8± 7.0
Ball throwing speed, m/s	26.4 ± 1.5	-	21.8± 1.6	-	23.8± 1.9
Relat.VO_{2maks}, ml/ kg·min.	46.4 ± 4.4	57.3± 3.1	-	58.7± 0.9	-

Aerobic capacity of our handball players is approximately for 20 % lower in comparison with the amateur and professional athletes from France [3]. Its value coincides with the norm for young (20 – 29 year olds) untrained males. This means that our handball players need to improve their aerobic endurance and performance of cardiovascular system.

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INVESTIGATION OF PROFESSIONAL AND SPECIAL COMPETENCES OF LITHUANIAN PHYSICAL EDUCATION TEACHERS BY RESIDENCE PLACE

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The purpose of the study was to investigate professional and special competences of Lithuanian physical education teachers by residence place, reflecting their readiness to apply new schoolchildren's physical education ideas. Survey's data are interpreted founding on the research of foreign scientists and state documents, regulating education.

The content of professional competences is composed altogether of psychological, pedagogical, methodical, ethical, cultural, social, sport knowledge and skills and the ability to apply them implementing concrete tasks of physical education. Special, or subject-related competences combine planning and realization of the of physical education content, applying technologies, managing of education process, as individualization, differentiation, creation of learning surroundings. Novelty of physical education ideas are related to implementation of new education paradigm, renewed secondary school curriculum, new education technologies.

The study was based on anonymous questionnaire. Study sample consisted of 357 physical education teachers from secondary schools. Study population was selected randomly from the Lithuanian teachers of physical education ensuring that representatives from all districts will fall in to the study group. Statistical analysis of empirical data was performed using SPSS PC/8.0. To assess contingency tables, χ^2-test was used. To assess the inner consistence of the subjects in the questionnaire *Cronbach alfa* coefficient was used.

It was found that most problematic competences that are essential applying new physical education ideas into practice, and that were self-evaluated by physical education teachers as insufficient, where use of ICT (46.9%), integrating materials of other subject into content of physical education (43.0%), creating health favourable education environment (40.5%), absorbing and applying positive experience of physical education (32.2%), accepting new ideas of physical education (33.1%), planning long-term physical education objectives for the student (24.9%). All mentioned competence were evaluated as insufficient significantly more often by representatives from country schools, compared to those from city schools. Most physical education teachers self-evaluated their communication ability with schoolchildren, colleagues, and parents as appropriate or satisfactory.

Study revealed that among special competences that expect more attention is the ability to work with the students of impaired health. This competence pointed out as insufficient 32.7% of the respondents. Physical education teachers also expressed insufficient abilities to work at the lesson with more than one class at the same time (19.2%), to individualize student‘s physical load (15.0%), to vary the content of physical education lesson (15.2%), to work with little inventory (14.4%), to evaluate objectively and to promote student‘s achievements (12.9%), to explain easily the benefit of physical exercise to the student (10.4%), to organize independent student‘s work during physical education lesson (10.1%). All special competences, evaluated as insufficient, were pointed out significantly more often by representatives from country schools compared to those from city schools. Work experience and sex has little influence on self-evaluation of professional competences.

Therefore, developing the content of physical education teacher's competences it would be worse to make themselves master modern physical education ideas and technologies, to help implementing health promotion tasks to school community. New education paradigm and renewed secondary school curriculum could be implemented giving special attention to the development of teacher's competences working in country schools.

THE INFLUENCE OF ADAPTED PHYSICAL ACTIVITY ON SELF-SUPPORT SKILLS TRAINING FOR CHILDREN WITH AUTISM

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Autism is most difficult child's development disorder, which come through impaired social interaction and communication, restricted and repetitive behavior. Recently, scientists from different scientific areas are interested in autism. They are trying to detect syndrome causes and looking for methods to help child with autism to reach as much adaptation skills as possible to be involved in everyday social life (Frit, 1991; Zager, 2005; Sicile-Kira, 2004; Robledo, 2005). All children with autism are different and require individual teaching methods, but autism disorder always leads to a general learning problems: lack of motivation and interest limitations, difficulties in mastering new skills and inability to use their new knowledge in practice, to concentrate and maintain attention, problems in activity organization; inability to express their wishes (Mikulėnaitė, 2004). Because of that it is very important to look for most perspective educational methods, to create new and develop existing methods and therapies to improve children's with autistic opportunities for adaptation and self-sufficiency skills (Ivonytė ir kt., 2009; El-Ghoroury et al., 2010). The influence of adapted physical activity (APA) on children with autism have not been sufficiently investigated, though some researchers reported that physical activity is essential for these children as it involves communication, education of social interaction, behavior modification and other important social skills expression (Menear & Smith, 2008). **The aim of the study** – to evaluate the influence of adapted physical activity on self-support skills training for children with autism.

Methods of the study and organization. The skills assessment scheme (consists of 11 scales) (Ivoškuvienė, Balčiūnaitė, 2002) was used to evaluate children with autism. According to the aim of the research and applied APA programs, only seven scales of the instrumentation were used: *attentiveness* (9 tasks), *gross motor* (21 tasks), *fine motor* (36 tasks), *hand and eye coordination* (7 tasks), *independence* (48 tasks), *games* (21 tasks) and *behavior* (51 tasks). Each task was evaluated from 1 to 5 points (1 – child do not understand and cannot perform a task, 2 – child performs a task with the help of adult, 3 – child performs a task by imitating, when a task has been demonstrated by professional, 4 – child performs a task after reminding, 5 – child performs a task independently). SPSS software for Windows 11.0 was used for data processing.

The data has been collected by carrying out a survey among 14 boys with autism (age average - 4.19±1.31). The study was carried out from July till November in 2011. After the individual evaluation, for each child APA program was developed and applied for 5 months 3 times per week.

The results of the study. Analysis of the results showed that all the investigated parameters of the children who participated in individual APA programs improved. The most significant improvement was observed in attentiveness of children with autism (respectively 2.85 ± 0.85 and 3.21 ± 0.69) and independency skills (respectively 2.40 ± 0.82 and 2.81 ± 0.79) ($p < 0.5$). Some children after participating in APA program began to concentrate attention on ongoing activities, react to adults' commands, self-undress, unfasten and fasten buttons, etc. Although the APA programs were designed to stimulate independency and self-development skills**,** improvement of motor functions and hand - eye coordination was measured as well ($p > 0.5$). Data analysis indicated that participation in APA program had no significant influence on game skills (respectively, before participation in the program - 2.57 ± 0.91 and after - 2.81 ± 0.71) and behavior (respectively, before participation in the program - 2.47 ± 0.54 and after - 2.66 ± 0.46) of children with autism. Majority of the children with autism get into fluster when the routine changes, avoid eyes contact, have no feeling of danger, and do not react to the positive comments. Analysis of the results leads to **the conclusion** that APA program for children with autism has a positive effect, but it should last for a longer period of time and focus not only on the individual skills improvement, but also on children's social adaptation and quality of life.

THE ASSOCIATIONS OF PUBERTAL DEVELOPMENT AND SOCCER TRAINING ON ANTHROPOMETRICAL PARAMETERS IN 10-11 YEAR YOUNG BOYS

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Physical performance and fitness are related to biological maturation during male adolescence. The relationship is more pronounced when boys of contrasting maturity status (early vs. late matures) are compared. Early maturing children have advantages over late maturing children in physiological and anthropometric characteristics (eg. strength, height, body mass) (Vegers, et al. 2012). Several studies have reported that increased selection opportunities in soccer tend to favour older and physically taller boys (Philippaerts et.al. 2006). Cross- sectional data are reasonably consistent in showing that early maturing boys tend to be more successful in soccer in mid- and late adolescence (Philippaerts et.al., 2006). **The purpose** of the present study was to examine the effect of soccer training to anthropometrical parameters in 10-11 year boys.

In total, 110 schoolboys aged between 10-12 years were divided into soccer (n=55) and the control (n=55) groups. The subjects were matched by age and body mass index (BMI), generating 24 matched pairs in group I (late maturing), 23 pairs in group II (on time maturing) and 12 pairs in group III (early maturing). Body composition (Fat%, FM, FFM) measured using DXA.

Soccer players in group I had significantly ($p<0.05$) lower body fat% and fat mass (15.97±5.52 v. 18.02±6.00% and 5.32±2.35 v. 6.12±2.97 kg). Soccer players in group II had significantly ($p<0.05$) higher fat free mass, BMC (30.33±4.24 v. 28.18±3.84 kg and 1.57±0.27 v. 1.44±0.22 kg) and lower APHV (13.20±0.44 v. 13.43±0.35). In group III we found no significant ($p>0.05$) differences in soccer players and control group.

In conclusion, soccer specific training was significantly related to body composition especially in late maturing and on time maturing group, however in late maturing group we found no differences in soccer and control boys.

THE EFFECT OF SPEED TRAINING ON MAXIMUM STRENGTH, MAXIMUM SPEED AND POWER INDICATORS IN YOUTH RUGBY PLAYERS

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Introduction. Lithuanian rugby team is ranked 40th worldwide. On 2010 Lithuanian U-21 youth rugby team won European championship which was held in Sweden. To achieve even greater results and to reach higher spot on the ranking table, we should improve our training process, look for more advanced technologies, and try to understand organism adaption variations.

The purpose of the study. To define effects of 3 week speed training programme on maximum strength (Smith machine), maximum speed (30 meters sprint. 20 meters for acceleration) and power (30 meters sprint) in youth rugby players.

Hypothesis. We think that 3 week speed training programme will produce significant changes on maximum speed and power indicators and maximum strength values might decrease. We know exact percentage of rugby physical abilities: speed 5 %, speed – strength 15 %, strength – speed 40 %, explosive strength 20 %, maximum strength 20 % (Sandler, 2005). In our investigation we want to examine how speed training programme will affect other physical abilities values. Research that we did, will help to interpret organism adaption process, upgrade training process and will let Lithuanian rugby team to compete in highest level competitions.

Research methodology. 10 youth rugby players, most of them members of Lithuanian youth rugby team volunteered to participate in study. Body mass and height were measured. The means were: body mass – 78. 55 ± 8.971 kg, height – 1.78 ± 0.06 cm.

Before 3 week speed training period, all participants were tested in Lithuanian academy of physical education track and field hall. The following tests were performed: 30 meter sprint, squat with maximum weight (Smith machine) and 30 meter sprint with 20 meter for acceleration. The each test was completed twice and the best result from two attempts was taken for statistical analysis. After testing players completed 3 week speed training programme. The same tests were accomplished training programme. Mean and standard deviation were calculated. T-test for dependant samples was used to determine differences between initial and final measurement. Statistical significance was set at $p<0.05$. Data analysis was performed using the *Microsoft Excel.*

Results. The statistical procedures revealed that there were no significant interaction between the maximum speed and power ($p > 0.05$). After 3 weeks of speed training power has improved by 1.26% and maximum speed by 1.77%. Speed training programme had statistically important negative effect on maximum strength ($p < 0.05$). Maximum strength has decreased 6.82 %.

Conclusion. 3 week speed training has slightly improved power and maximum speed. Although, experimental data demonstrate that speed training can lead to significant decrease of maximum strength. These observations may point to potential changes, so the coaches are warned to use more strength exercises during speed training period if they do not want to lose maximum strength which is very important factor playing rugby.

ALTERATION OF ADOLESCENT – BOYS AND GIRLS – ATHLETIC IDENTITY WHEN APPLYING BRIEF COUNSELLING

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Introduction. As methods of cognitive impact are on the rise, the application of *solution focused brief counselling* regarding physical activeness should be seen as a means of a union between the promotion of physical activeness and health-related instruction within the curriculum of physical education at school. **Aim** of the study – to identify the alteration of adolescent – boys and – girls athletic identity when applying solution brief counselling.

Subjects and methods. 39 adolescents were consulted in the frame of solution focused brief counselling. 50 adolescents were not consulted and constituted the comparison group. Athletic identity questionnaire (Anderson, 2004) was filled in twice by all the consulted adolescents before and after consulting while the members of the comparison group did it twice within the period of one month.

Results. The general evaluation of one's athletic identity ($p<0.01$) among counselled adolescents significantly increased. The support from others ($p<0.05$) for involvement in physical activities among girls increased for them significantly while there were no substantial alterations among boys. In other criteria of the scale of athletic identity including the assessment of one's appearance ($p>0.5$) and competences ($p>0.05$) there were no significant changes both groups: boys and girls. No significant changes happened in students within the group of comparison.

Discussion and conclusions. Solution focused brief counselling is suitable for consulting adolescents at school and an efficient method improving the adolescent capacity for solutions and orienting adolescents' physical activity. While orienting physical activity among girls social support is more important than among boys.

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MUSCLE STRENGTH OF LOWER EXTREMITIES AND KNEE JOINT FUNCTION IMPROVE AFTER HOME EXERCISE PROGRAM IN WOMEN WITH GONARTHROSIS SCHEDULED FOR TOTAL KNEE ARTHROPLASTY

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Introduction. Previous researches have found that patients with gonarthrosis have decreased force production of lower extremity muscles (Rossi and Hansson, 2004), reduced knee range of motion (Michael *et al.*, 2010) and experience knee joint pain. The aim of the present study was to investigate the effect of a home exercise program (HEP) on muscle strength of lower extremities and knee function in women with knee joint osteoarthritis (OA) who were undergoing total knee arthroplasty (TKA).

Ten women (aged 61.2 ± 2.7 years) with knee joint OA in stage III by Kellgren and Lawrence scheduled for unilateral TKA participated in this study twice (before performing HEP and 2 months later before the operation). All subjects performed a HEP daily during 2 months which included strength, balance and stretching exercises. Unilateral and bilateral isometric maximal voluntary contraction (MVC) strength of leg extensor muscle was measured with a custom-made leg bench. Isometric MVC strength of quadriceps femoris and hamstring muscles was investigated by Lafayette Manual Muscle Test System. Peak torque of maximal voluntary contraction (MPT) was measured and its ratio to body mass (MPT:BM) was calculated. Knee joint pain was assessed with a visual-analogue scale and knee active range of motion (AROM) was estimated by Gollehon Extendable Goniometer (Lafayette Instrument, USA).

Isometric MPT and MPT:body mass ratio of leg extensor muscle in the involved leg increased remarkably ($p<0.01$) after performing HEP during 2 months as compared with initial data. Patients had remarkable increase ($p<0.05$) of isometric MVC strength of quadriceps femoris and biceps femoris muscles after 2-month performing of HEP. Also knee AROM of the involved leg increased significantly ($p<0.05$) after performing HEP during 2 months. Knee joint pain of the involved leg did not decrease significantly ($p>0.05$) 2 months after HEP.

Isometric MPT loss of knee extensors has been previously found in patients with knee joint OA (Tan et al., 1995). Hurley (2003) has found that for patients with severe OA, there is convincing evidence that exercise improves muscle sensorimotor dysfunction and reduces pain and disability without exacerbating joint damage. In present study a considerable increase of muscle strength of lower extremities was noted after 2 months of performing HEP. Knee joint function also improved after performing HEP for 2 months (the knee joint AROM increased).

It was concluded that home exercise program during 2 months before scheduled TKA improved patients' preoperative state. Further research needs to assess the influence of pre-TKA HEP on neuromuscular performance in patients' postoperative recovery.

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THE TIME COURSE OF OXYGEN UPTAKE, HEART RATE AND EMG DURING TWO MONTH OF MODERATE INTERVAL ENDURANCE TRAINING: A CASE STUDY

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The optimal functioning of cardiopulmonary and skeletal muscle systems is critical for wellbeing and health. The endurance exercise is one of effective manner to modulate the functions of these systems. Previous reports suggest that moderate intensity training is sufficient to produce substantial benefits (Lee et la., 1995; Iwasaki et al., 2003) in healthy untrained subjects. However, the adaptation of defined systems within training period is still not clear. Accordingly, this study was design to improve insight of cardiopulmonary and skeletal muscle systems adaption during the course of moderate intensity interval endurance training. The aim of this study was to assess dynamic of oxygen uptake ($\dot{V}O_2$), electromyography (EMG), heart rate (HR) and anthropometric parameters within moderate intensity interval running training.

26 years–old female (stature – 1.80 m; weight – 99.2 kg; $\dot{V}O_{2\,max}$ – 37.2 ml·kg^{-1}·min^{-1}) was involved in 8 weeks duration moderate interval endurance training (IET). The training session consisted of 8 repeats of following intervals: 4 min. running at constant moderate intensity followed by 2 min. walking (at 5 km/h) and 2 min. rest periods. The subject performed 3 training sessions a week separated by 1 – 2 days rest. The initial intensity of training, 90% of the first ventilation threshold, was estimated after completion of incremental running test (IT) until exhaustion and re–estimated every four week during the course of endurance training. $\dot{V}O_2$, EMG parameters (integrated electromyogram (iEMG), root mean square (RMS) of right leg m. vastus lateralis, m. vastus medialis and shin m. gastrus lateralis, m. gastrus medialis), anthropometric parameters (body mass, free fat mass and fat mass) and HR were measured every two weeks. All training sessions and testing were performed on a LE 200 CE treadmill (VIASYS, Germany), for gas analyzing, EMG, HR and body composition measurement using portable gas analyze (Jaeger, Germany), surface EMG system (Biometrics Ltd, USA), HR monitor (Polar, Finland), body composition analyzer (Tanita, Japan), respectively.

The relative $\dot{V}O_{2\,max}$ increased 3.7 ml·kg^{-1}·min^{-1} during IT after two month IET. The relative $\dot{V}O_2$ ml·kg^{-1}·min^{-1} decreased significantly after 2, 6 and 8 weeks and HR decreased significantly after 4, 6 and 8 weeks during running intervals of training sessions. After two month IET subject body mass decreased 9.5 kg, fat mass 7.5 kg and free fat mass 1.9 kg. The iEMG of m. vastus lateralis and m. vastus medialis during running intervals of training sessions was significantly increased after 6 and 8 weeks but no significant changes of that parameter of m. gastrus lateralis and m. gastrus medialis. The following significant changes in RMS of EMG during running intervals of training session were observed: increase after 6, 8 weeks of m. vastus lateralis, after 4, 6 and 8 weeks of m. vastus medialis, after 2, 6 and 8 weeks of m. gastrus medialis and decrease after 4, 6 and 8 weeks of m. gastrus lateralis.

Two month moderate aerobic interval endurance training has significant on body composition running economy, HR and EMG parameters of leg muscle.

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BIOCHEMICAL ADAPTATION TO ALTITUDE TRAINING AND TRAINING IN PLAIN IN CROSS COUNTRY

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Introduction. The effectiveness of altitude training depends on numerous factors: altitude level, duration of stay in mountains, particularities of acclimatization process, training process during altitude training, re-acclimatization after staying in the mountains, etc. In addition, to obtain positive effect of altitude training it is necessary to take into account length and frequency of stay in mountains, athlete's qualification and age, individual susceptibility to hypoxia, which is genetically determined. During altitude training athletes are influenced by a low atmospheric pressure, harsh shifts of day and night temperatures, low absolute humidity, intense solar radiation, strong winds, high air ionization, etc. All factors are potentially stressful and affect the athlete's body not in isolation but in combination. Combined effect of these factors determines adaptation mechanisms to altitude training.

The purpose of this study was to analyze influence of altitude training on biochemistry and hematology status of skiers in annual cycle of training.

Methods. 8 high quality skiers (4 men and 4 women) were observed during annual cycle of training 2009-2010 years (total of 319 investigation). Blood sample was collected usually in start of training microcycle. Biochemical and hematological investigations were carried out on QBC Autoread plus (Beckton Dickinson), PM 2111 (Solar) and «SUNRISE» devices. All results were divided in two groups: in altitude (1100-1700 m) and in plain 180-261 m. U-test Mann-Whitney method was used for statistic investigations.

Results and discussion. We observed that in male athletes hemoglobin and haematocrit values were significantly higher in the mountains compared to lowland conditions: hemoglobin 167.5±0.6 g/l and 164.8±1.0 g/l and haematocrit 50.6±0.2% and 48.9±0.4%, respectively (P <0.05) (Table).

Table

Biochemical and hematological tests of high quality skiers during altitude training and training in plain

Tests	Female		Male	
	plain (n=43)	altitude (n=96)	plain (n=52)	altitude (n=128)
WBC. 10^9/l	6.51±0.80	7.60±0.43	6.46±0.52	8.17±0.41*
HGB. g/l	140.9±1.6	142.4±1.1	164.8±1.0	167.5±0.6*
HCT. %	42.3±0.5	43.7±0.3*	48.9±0.4	50.6±0.2*
MCHC. g/dl	33.7±0.1	32.1±0.1*	33.9±0.1	32.7±0.1*
PLT. 10^9/l	182.3±14.2	267.9±5.9*	224.5±8.9	275.6±4.9*
Neutrophils. %	52.53±3.81	60.89±1.94	51.61±2.51	58.95±1.41
Lymphocytes. %	35.32±3.13	38.38±1.84	39.89±1.87	40.31±1.36
Neutrophils. 10^9/l	4.32±1.19	4.69±0.43	6.45±1.34	5.41±0.43
Lymphocytes. 10^9/l	2.04±0.19	2.59±0.11	2.86±0.30	3.07±0.10
Urea. mmol/l	5.53±0.24	5.47±0.16	5.38±0.19	5.06±0.12
CK. U/l	216.2±19.9	214.8±11.3	296.2±29.2	297.9±20.3
Glucose.mmol/l	4.34±0.10	4.61±0.10	4.51±0.13	4.75±0.09
AST. U/l	30.73±1.45	30.93±1.13	28.08±1.55	29.36±1.07
ALT. U/l	20.82±1.43	24.73±1.13	15.89±1.00	23.64±0.80
Triglycerides. mmol/l	0.66±0.03	0.64±0.03	0.71±0.04	0.65±0.03
Potassium. mmol/l	4.92±0.10	4.65±0.17	4.58±0.15	4.54±0.12
Magnesium. mmol/l	0.99±0.03	1.01±0.03	1.08±0.03	1.09±0.02
Cortisol. nmol/l	721.9±48.6	897.8±56.9	874.4±11.6	1016.3±44.5*
Testosterone. nmol/l	1.58±0.24	1.80±0.14	13.32±0.24	12.92±0.83

In female group a significantly higher haematocrit value was obtained in mountains compared to plain ($P < 0.05$). Mean corpuscular volume (MCV) in the plains was significantly lower in male compared to women (86.7±0.5 and 90.2±0.2 fl. respectively. $P<0.05$). Mean cell hemoglobin concentration (MCHC) was significantly lower in mountains compared to plain both in men and in women ($P < 0.05$). Perhaps this is due to advent of oversized erythrocytes in the peripheral blood when training in the mountains, what may be indicative of the erythropoiesis and erythroid cell rejuvenation. A significant increase of reticulocytes in women in mountains compared to plains also gives evidence to erythropoiesis activation.

Altitude training was accompanied by a significant increase in cortisol levels compared with the training on plain ($P<0.05$). This indicates that high training loads in mountains are very stressful. In consequence of muscle loading an CK increase in both groups of athletes was observed. We observed significantly increase of leukocyte and platelet level in mountain area. Increase of leukocyte level may be as result myogenic nature of leukocytosis under the influence of intense muscle activity. Increasing of leukocytes while in mountainous areas compared to plain was largely a result of increased number of neutrophilic cells. Activation of platelet was accompanied by a significant increase in blood platelets while in mountains both in women ($P<0.05$).

Conclusions:

1. Adaptation to altitude training was accompanied by improvement of oxygen transport properties of blood and activation of processes of erythropoiesis, which was more represented in male group of athletes.
2. Hemoglobin dynamics indicates individual differences in examined athletes, due to nature of organization of training loads in the mountains, as well as individual characteristics of sportsmen including possibly a genetic component, which should be considered for individualization of training process in mountains.
3. Altitude training was characterized by increase metabolic processes activity with some predominance of catabolic processes.
4. Execution of the strenuous muscle work in mountains due to higher activation of leukocyte and platelet hematopoietic lineages compared with training on plain.

SPORT STUDENT GENDER UNBIASED PROFESSIONAL (SPORT) FOREIGN LANGUAGE COMPETENCE

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Introduction. Sport professionals of the XXI century should be able to communicate and know Sports terminology in at least three foreign languages. In Latvian Academy of Sport Education (LASE) Professional (Sport) foreign language competence is developed in separate study courses. Although in all stages of education the researchers have proved the superiority of women language use skills over those of men. Research into the knowledge of Sport vocabulary has shown that women are not always superior in verbal skills (Omrčen/Bosnar. 2010).

Explanations of female verbal superiority have been sought in biological and in social factors including stereotyping. Omrčen and Bosnar causes for bridging gender gap in verbal skills find in sport HEIs students who actively participate in physical activities thus developing a better perception of themselves (Sonstroem. 1997). What often leads to the increase of global self-concept (Spence/McGannon/Poon. 2005; Karanauskienė/Kardelis. 2005) and emotional intelligence.

Verbal skills might increase due to increased amount of testosterone which decreases the interest for socializing except in the cases concerning sports (Brizendine. 2008).

To compare male and female professional (Sport) foreign language competence were compared 3 sets characterizing foreign language competence: scores in centralized secondary school leaving exams; Grades total in the study course of Professional foreign language; Scores total in presentations and presentation evaluation blocks. Presentations were evaluated in 6-point scale scores in centralized secondary school leaving exams were from 83.99% (A level) to 31.99% (E level).

The difference between the achievements of both genders was determined with the Mann-Whitney U test. Sample consisted of the following LASE last five academic year students:

1) 345 student scores in centralized school leaving exams;
2) 109 student Grades in Professional (Sport) foreign language;
3) 110 student scores total in presentations and in presentation evaluation blocks.

The results show that male and female Sport student:

1) scores in school leaving exam and in the study course of Professional foreign language are not statistically significantly different;

2) presentation scores total and scores according to 5 groups of criteria in the opinion of the lecturer are not statistically significantly different but the scores obtained in the process of self-assessment and peer-assessment are different: female Sport students over evaluate themselves and their peers.

Sport student gender unbiased development of Sport English competence is an unexpected result. the cause of which might be due to the influence 1)social factors - Sport student lifestyle: constant

engagement in sport activities; 2) physiological factors (increased level of testosterone. which combined with engaging in sport activities. increases interest in communication) and 3) psychological factors (increased self-esteem and emotional intelligence) and social (participating in international camps and competitions). Female Sport students over evaluation of their and their female peer achievement in presentations might be the result of increased self-esteem. Further investigations might help to solve the problem.

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INTER-RELATION BETWEEN 15–16 YEAR AGED SCHOOLCHILDREN PHYSICAL ACTIVITY. PHYSICAL FITNESS AND ACADEMIC ACHIEVEMENTS

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Introduction. Children's physical fitness (PF) is directly interrelated with physical development and physical activity (PA). The child's physical development and physical activity is improving when his physical activity is growing and its quality is changing (Malina et al., 2004). Researches stated many benefits of PA: positive effect on the prevention of various diseases in schoolchildren and on their cognitive development (Burdette, Whitaker. 2005) increases self-esteem and controls the levels of anxiety and stress (Dunn et al. 2001) normalizes the state of mind and certainly it affects the level of physical fitness (PF) (Dencker et al.. 2006. Sarr. 2008). Kids who are more physically active tend to perform better academically (Coe et al. 2006; Castelli et al. 2007). We are raising the question do kids who are more physically active tend to perform better physical fitness level and better academic achievement. **The aim of research** was to establish inter-relation between schoolchildren's physical fitness physical activity and academic achievements.

Material & Methods. The participants were 200 healthy schoolchildren of 15–16 year aged schollchildren. PA was measured by a modified short form of an international PA questionnaire (*IPAQ. Ainsworth. Levy. 2004*). According to the recommendations of the *IPAQ Guidelines* all the respondents were divided in three PA categories. The participants performed PF tests for *muscular strength and endurance* (sit ups and bent arm hang) *and explosive power* (long jump). In order to aces schoolchildren's academic achievement were registered their average learning results and results of different subjects. Schoolchildren's were divided in four quartiles according to their academic achievement in school.

Results. It is observed that boys had statistically significant better academic achievement than girls ($p<0.05$). Comparing data according to the gender statistically significant difference was established in moderate to vigorous physical activity length in minutes and days also the walking frequency ($p<0.05$). There were not established the correlations between total amount of PA and academic achievements ($r=-0.094$; $p>0.05$). Comparing academic achievements and trunk muscle endurance, muscular strength and power results was established positive statistically significant interrelation ($r=0.169$. $p<0.05$). The present study shows that when the academic achievements are getting worse, the trunk muscle endurance results and muscular strength and power results are getting better ($r=-0.382 \div -0.355$. $p<0.05$).

Conclusions. There were not established the correlations between total amount of physical activity and schoolchildren academic achievements ($p>0.05$). However the pupils learning in the middle level are a little bit more physically active than the other subjects.

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PHYSICAL ACTIVITY OF SCHOOLCHILDREN AGED 15–16 YEAR LIVING IN URBAN AND RURAL AREAS AND ENVIRONMENTAL FACTORS INFLUENCING IT

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Introduction. Physical activity (PA) is beneficial to health at all ages. It is especially important to the healthy development of children and young people. Adequate PA provides good mood improves students nervous system and has positive influence on learning outcomes. However PA of most people in these modern times significantly decreased and it is influenced by the built and natural environment in which they live (Haerens et al. 2010). By the social environment and by personal factors such as gender (McKenzie et al., 2000) age (Wallace, 2003; Ridgers et al., 2006) ability and motivation (Chen. Full, 2005). In two-tree decades schoolchildren living in rural areas PA decreased dramatically. That's why **the aim of the research** was to compare schoolchildren aged 15–16 year living in urban and rural areas physical activity and environmental factors influencing it.

Material & Methods. The participants were 176 healthy schoolchildren of 15–16 year aged schollchildren. PA was measured by a modified short form of an international PA questionnaire (*IPAQ. Ainsworth. Levy. 2004*). According to the recommendations of the *IPAQ Guidelines* all the respondents were divided in three PA categories. The questionnaire consisted of four parts which led to the PA intensity frequency days per week (d./wk.) and the duration in minutes per day (min./d.) (recorded for the duration - longer than 10 minutes at a time). Walking time through a week longer than 10 minutes at a time (d./wk.) per day and duration (min./d.) and duration of sitting per day (min./d.). Schoolchildren' living environment factors and their influence on physical activity and barriers related to physical activity were assessed according to the modified form Project GRAD (*Project GRAD. Two Year Follow-Up Health Survey. 1997*). Appropriate **statistical methods** (mean. (x) and the *standard deviation* (SD) *t test* criterion for dependent samples) based upon the experimental design were applied. The following reliability levels of statistical conclusions were used: $p<0.05$ – reliable; $p>0.05$ – no reliability.

Results. It is observed that schoolchildren living in rural areas and living in their own houses are more active ($p<0.05$). The results indicate that boys spend more time walking than girls ($p>0.05$). In contrast girls spending more time by sitting ($p<0.05$). This is characterized as well by city living schoolchildren living in the apartments'. The largest physical environmental barriers to be physically activity by gender are optional equipment and the lack of activity. Schoolchildren living in rural and urban agree that the biggest problem – lack of equipment. Schoolchildren living in rural and urban areas agree that the biggest psychosocial environmental barriers are fatigue weather conditions and not to be occupied with physical activity.

Conclusions. It was not established statistically significant differences ($p>0.05$) between rural and urban schoolchildren according to the total amount of PA frequency and duration. The largest psychosocial environmental barriers to be physically active are a lack of confidence in their appearance appearance lack of knowledge and fatigue.

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RELATIONSHIPS BETWEEN BIOLOGICAL AGE. BODY COMPOSITION AND BONE DENSITY IN PREPUBERTAL GIRLS (JÕGEVA. ESTONIA)

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Aim of the study was to investigate the relationships between bone parameters (bone mineral density [BMD], bone mineral content [BMC]), body composition (fat mass [FM], fat free mass [FFM]) and bone age in normal healthy girl. Subjects and methods: In total 43 7-9 year-old girls from Jõgeva (Estonia) were studied. They had 2-3 times a week compulsory physical education lessons (45 minutes each) at school. Body height and mass (BM) were measured and body mass index (BMI) calculated. Body composition was determined by dual energy X-ray absorptiometry (FFM. FM. BMD and BMC). To estimate bone maturity a radiograph of the non-dominant hand was taken and analyzed (Greulich & Pyle. 1959). Results: Bone age had significant relationships with body height (r=0.509), BM (r=0.537), FM (r=0.452), FFM (r=0.520) and BMI (r=0.417). Interestingly from the bone parameters only L2-L4 BMD (r=0.552) and L2-L4 BMC (r=0.560) correlated significantly with biological age. In conclusions young moderately physically active girls biological age more connected with anthropometrical and body composition parameters compared with bone parameters.

RELATIONSHIPS BETWEEN CONTRACTION PROPERTIES OF KNEE EXTENSOR MUSCLES AND FASTING IGF-1 AND ADIPOCYTOKINES IN PHYSICALLY ACTIVE POSTMENOPAUSAL WOMEN

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Aim of this cross-sectional study was to find possible relationships between insulin-like growth factor-1 (IGF-1), adipocytokines (leptin and adiponectin) and twitch contraction (TC) characteristics of the knee extensor (KE) muscles in healthy physically active postmenopausal women (n=28. 64–78 years old). Subjects and methods: Twenty-eight postmenopausal women (64–78 years old) volunteered to participate in the study. Women were physically active, taking regularly part in organized female gymnastics lessons 2–3 times per week for at least recent 10 years. Subjects consumed their ordinary everyday diet. All women were asked to come for three visits to complete the testing. On the first visit, the participants had a venous blood sample taken in the morning after an overnight fast, and the anthropometric parameters were measured and body mass index (BMI) was calculated. All the subjects were measured MVC torque and twitch contractile properties of KE muscles in a custom-made dynamometric chair. To assess the contractile properties of the KE muscles, electrically evoked isometric twitch was elicited by percutaneous electrical nerve stimulation. Serum leptin, adiponectin, IGF-1, insulin-like growth factor–binding protein-3 (IGFBP-3) and insulin were determined. Results: There were a very few significant relationships between the measured muscle contractile parameters and fasting blood hormones. TC Pt correlated significantly with IGFBP-3 (r=0.652. P=0.001) and insulin (r=0.495. P=0.007). In conclusion, this study suggests that only TC peak torque correlated positively with serum fasting IGFBP-3 and insulin concentration. Adipocytokines leptin and adiponectin not correlated significantly with measured strength parameters in physically active postmenopausal women

THE EFFECT OF RESISTANT TRAINING ON SKELETAL MUSCLE FIBRE TYPE TRANSFORMATION AND CONTRACTILE PROTEIN COMPOSITION

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Skeletal muscle plays an important role in locomation and determing success in competitive sports.

Resistant training is a potent stimulus with dramatic effects on muscle. induced changes at the muscle level have been related to hypertrophy in different types of muscle fibres and changes in contractile protein composition and strength.

Contractile activity can induced differential expression of myosin protein isoforms in skeletal muscle.

The present study was undertaken in order to investigate the effect of resistance exercise with extra weight on skeletal muscle fibre area and contractile proteins composition of muscle tissue.

An animal model was used. Training programme consisted of resistance exercise in vertical treadmill. 16-18 week old rats were running up with extra weight. Myofibrillar proteins were analysed using SDS-PAGE and morphological characteristics using histochemical techniques.

Our data showed that uphill running on vertical treadmill with extra weight caused significant changes in the content of total myosin heavy chain (MyHC) and myosin light chain (MyLC) . Mechanical loading resulted in the selective up- and down-regulation of MyHC and MyLC isoforms in fast-twitch skeletal muscle and changes in the relative content of the MyHC isoforms show correlation with grip strength.

In conclusion: resistant training resulted in the changes of muscle fibres cross-sectional area. selective regulation of myosin isoforms in skeletal muscle and lead to changes in grip strength.

RELATIONSHIP BETWEEN LOW BACK PAIN AND HIP AND TRUNK ROTATION AND CORE ENDURANCE IN AMATEUR MALE GOLFERS

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Introduction: Golf is a unique sport that has been growing in popularity all around the world and can be played and appreciated regardless of age, gender, or athletic ability [1]. Low back pain (LBP) is one of the most common musculoskeletal complaints among golfers [2]. Research shows that low back pain in golfers can be determined by repetitive asymmetrical trunk rotations, decreased core endurance and diminished amplitude of hip rotation [1. 3].

The aim of the study was to determine the relationship between low back pain (LBP) and hip and trunk rotation and core endurance in amateur male golfers.

Methods: Twenty-six amateur male golfers (age 43.6 ± 8.9 yr.; BMI 26.6 ± 3.6) participated in the study. History of LBP and golf related data (playing duration. intensity and golfers' handicap) were taken. Subjects underwent measurements of hip medial and lateral as well as trunk rotation active range of motion (AROM) with goniometer [4]. Core endurance was assessed by timing the golfer's ability to maintain each of three McGill's functional test positions: (a) the lateral musculature test performed on each side, (b) the flexor endurance test, and (c) the back extensor test [5]. LBP intensity and functional disability (FD) level were evaluated according to Oswestry disability index [6].

Results: Amateur male golfers complained about LBP lasting from 3 till 15 years. Subjects' total lateral hip rotation AROM was significantly greater ($p<0.05$) than total medial hip rotation AROM (80±8.4° vs. 73±8.7°). Trunk rotation to the right was significantly greater than to the left (55±10.6° vs. 48±9.8°). Endurance of abdominal muscles was lower than back extensors (62±36.3 s vs. 79±38.8 s); endurance of the left lateral trunk muscles was significantly higher than the right lateral trunk muscles (56±21.6 s vs. 51±24.2 s). The functional disability of golfers was minimal (3.8±2.1 points or 8±5 %). but even the mild LBP forced them to limit some activities of their daily living. We found no significant relationship between LBP intensity nor FD level and hip and trunk rotation and core endurance in amateur male golfers. Golfers' handicap positively correlated with endurance of abdominal muscles ($r=0.42$. $p<0.05$) and negatively correlated with FD level ($r=-0.93$. $p<0.001$). There was a negative relationship between golfers' body mass index and endurance of abdominal muscles ($r=-0.4$. $p<0.05$).

Conclusion: Despite asymmetries in hip and trunk rotation AROM and decreased trunk stability we found no significant relationship between LBP intensity and hip and trunk rotation and core endurance in amateur male golfers with LBP history.

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IS DIFFERENTIAL TRAINING MORE EFECTIVE FOR RETRAINIG GAIT AND BALANCE IN ACUTE STROKE PATIENS THAN REPETITIVE MOVEMENTS?

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Introduction: There are two competitive approaches in science and practice of stroke rehabilitation: the repetitive approach (a target movement is repeated frequently for the purposes of imitation) and the spontanic approach (movements should be performed irregularly and spontaneously) [1]. Differential training could be as an example of the second idea. This method is widely used in professional sportsmen training [2. 3]. The differential training approach has been developed according to the principles of individuality, movement system variability and the nonrepeatability of movements. This method is tried to transfer to physiotherapy programs [3].

The aim of the study was to compare the effectiveness of repetitive movements and differential training for improving gait and balance in stroke patients during the first stage of rehabilitation.

Methods: twenty six acute stroke patients (mean age 64±2 yr.; male – 13. female – 13) were divided into two equal groups. During the physiotherapy repetitive movement approach was applied for the first group of the patients and differential training – for the second group. Every patient in average got 7 procedures of 30 min. duration physiotherapy. Patients' gait was assessed by the *Emory Functional Ambulation Profile (EFAP)* [4], balance – *Fullerton Advanced Balance Scale (FAB)* [5].

Results: After physiotherapy the gait and balance have significantly improved ($p<0.05$) in both groups. The comparison of the results between groups showed that gait and balance in patients for whom the differential training was applied have improved significantly more ($p<0.05$) than in patients, for whom the repetitive movement approach was applied (*Table*).

Table

Gait and balance score before and after PT in the first and second groups of stroke patients

Score	Before PT		After PT		Change	
	1 group	2 group	1 group	2 group	1 group	2 group
Gait	58.85±5.03	104.38±28.71	53.92±4.75*	61.15±7.22*	4.92±0.63	43.23±28.13**
Balance	25.23±1.61	20.08±2.37	31.77±1.01*	32.92±1.43*	6.54±0.87	12.85±1.60**

**– p<0.05 comparing results within groups; **– p<0.05 comparing results between groups.*
PT – physiotherapy; 1 group – repetitive movement; 2 group – differential training.

Conclusion: Differential training is significantly more effective than repetitive movements for retraining gait and balance in acute stroke patients.

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LIFE QUALITY DOMANS OF PHYSICALLY ACTIVE PEOPLE AND THEIR ADDICTIONS

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Introduction: science gives a lot of evidence that additional physical activity prevents a lot diseases. Additional 30 minutes of physical activity every day can lessen heart vascular diseases in 30-50 percent (1). Taking into consideration that death rate of heart vascular diseases in Lithuania produces more than a half of all the deaths every year, it is certain that physical activity is important not only for health care but also a factor of life quality, physical activity also influences solidarity of society and society cohesion. Taking into account these aspects a programme of socialization via sport is being introduced. Development of sport of disabled in Lithuania. Though it is supported miserably, is becoming a life standard (2. 3).

Purpose of the work: to examine quality of life structure determined on physical health of active sporting persons with vision, hearing and mobility disability. The following data received from the World Health Organization quality of life questionnaire WHOQOL-100. 103 respondents were interviewed, 65 of them men and 38 women from 15 to 72 years.

Methods of the research: physical domain quality of life structural analysis was performed using a standard quality of life evaluation algorithm, and the latent factors determined by the quality of life factor analysis method. SPSS (16.0) was used for the data analysis.

Results: it was found out that physical domain of quality of life is least affected of vision. a little bit more hearing, and more largely by mobility disability. Disability caused by pain and discomfort feeling athletes overcome by mobilizing their latent energy factors. Men and women disability equally affects their quality of life in the physical domain and it latent factors. Athletes' attitudes towards using alcohol and smoking did not depend on the type of disability. According to our data more than a half respondents rated their health as satisfactory. The received data about the attitude of the disabled towards the addictions showed that ever 85.6 percents of respondents agreed that smoking bad damages health and has a influence to their physical activity and sport. Even 51.3 percent of respondents smoke and use alcohol every day ($p<0.003$). During the latter years 3.8 percents of disabled respondents have taker drugs.

Implication: was found out that physical domain of quality of life is least affected of vision. a little bit more hearing, and more largely mobility disability. Disability caused by pain and discomfort feeling athletes overcome by mobilizing their latent energy factors. Men and women disability equally affects their quality of life in the physical domain and it latent factors.Athletes' attitudes towards using alcohol and smoking did not depend on the type of disability.

Keywords: quality of life, physical domain, disabilities, addictions, alcohol

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REACTION TIME OF PREPARATION FOR SIDE KICK IN TAEKWON-DO

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Introduction. Taekwon-do is a martial art, self-defence style and a kind of sport that was established in 1955 in Korea.

Speed is ability to perform a movement in a shortest possible time. In taekwon-do sport the special speed is specified by the speed of attack and defence reaction, kicking speed and motions frequency in series of kicks. Kicks and punches performed with the rapid force during the attack and reaction time in defence and counterattack define higher efficiency of the fight – a victory.

Kicking reaction time on an audio signal is 0.552-0.556 ± 0.005 s. on visual signal it is 0.5-0.513 s (Пашков. 2007), that characterizes athletes' reaction to opponent's actions.

The aim of the research is to determine reaction times factors of taekwon-do athletes.

Methods. 10 taekwon-do athletes (age: 12-14 years. height: 150-162 cm. weight: 38-52 kg; experience in sports: 3-5 years), with blue and green-belt levels participated in our study. Athletes performed side kick (Yop cahgi) with front leg two times. Motion capture was done with two high-speed "Basler" cameras (100 Hz), data were processed with "SIMI motion" software.

Results. Experimental groups side kick on the place with a reaction time of the preparation phase of 1.competitive period . Statistically significantly improved by 0.02 s from 0.21 s ± 0.01 s to 0.19 s ± 0.01 s (α <0.05). Between experimentant 1.competitive 2.sagatavošanas period was 2 months of the transitional period and 1 month rest, and the results of an increase in the time frame is minimal - 0.01 s. but is statistically significant (α <0.05).

But, comparing results before and 2, preparation 2, competitive periods have found that an increase of 0.02 s is statistically significant (α<0.05). Special taekwon-do sportsmen accelerates the results before and after the experiment, the side kick on the place with a statistically significantresponse time improvement of 0.03 s from 0.21 s to 0.18 s (α <0.05). Control group statistically significant results as a whole improved by 0.02 s (α <0.05).

The reaction time of the side kick improved significantly for 0.05 s from 0.25 ± 0.02 till 0.20 ± 0.01 s (α < 0.05). The result of the control group overall improved for 0.031 s (α < 0.05). The type of reaction time experiment, type of stimulus, and stimulus intensity are basic features of any reaction time experiment. .

Discussion. Athletes with the most experience has shown the best response time by 5%. Exercises in pairs to facilitate the movement sigfnalu the best response time improvement, which refers to the sport experience growth.

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CORRELATION ANALYSIS OF TAEKWON-DO SPORTSMEN'S KICKS BIOMECHANICAL AND ANTHROPOMETRIC PARAMETERS

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Introduction. Taekwon-do is a martial art, self-defence style and a kind of sport that was established in 1955 in Korea.

In modern science many researchers consider preparation and training process of top-athletes as a model or prototype for preparation of young athletes.

In this case the following anthropometric data are collected: body height, length of body segments, positions of the centres of masses in body segments, position of the total centre of mass in the body (the particularities of its position would require special attitude to biomechanical structure of combat elements).

The aim of the research to determine correlation between taekwon-do sportsmen's kicks biomechanical and anthropometric parameters.

Methods. 10 taekwon-do athletes (age: 12-14 years. height: 150-162 cm. weight: 38-52 kg; experience in sports: 3-5 years), with blue and green-belt levels participated in our study. Correlation between biomechanical parameters of the kicks (duration of the kick. duration of preparation and kicking phases. knee angle at maximal flexion) and anthropometric parameters of the athletes (body mass, body height. length and circumference of the segments of the leg) was evaluated during the study.

Results. There was observed a statistically significant positive correlation ($\alpha < 0.05$) between the duration of the frontal roundhouse kick with the front leg, and the length of the thigh. Athletes with larger body mass had shown better total kicking time and time of the kicking phases. Athletes with longer thighs had a smaller knee angle at maximal knee flexion. Athletes with longer thighs had worse kicking times. Maximal knee flexion angle is larger among the athletes with longer legs. Athletes with larger thigh and shank circumference had shown better total kicking time and also better time of kicking phases.

In the side kick better timing was typical to athletes with larger body mass and body height, longer shank and leg, and larger circumference of the shank and thigh. Larger knee angle at maximal knee flexion was observed among athletes with longer legs and shanks ($\alpha < 0.05$).

Discussion. The results of the study had shown that the kicking speed depends on biomechanical structure of the movement and anthropometric features of the athletes. Therefore determination of optimal biomechanical structure of the kicks with regard to individual particularities of the athletes promotes more effective planning and implementation of the training process.

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SIGNIFICANCE OF DEMOCRATIC VALUES TO SPORTS EDUCATION: PHILOSOPHICAL PERSPECTIVE

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Liberty, justice and tolerance are core democratic principles on which Western civilization is grounded and which remain relevant even during re-estimation of values in post-modern era. Keeping in mind that sport is an activity which oversteps all political and ethnic demarcations of our living world, we must also recognize it as a cultural practice, and as such it implies certain, unaltered system of values. Our research methodology is philosophical, involving conceptual analysis and the application of the outcomes to sports practice.

The very idea of democracy appeared and was materialized in Ancient Greece, in polis of Athens during the 5th century BC. Athenian system of education (which included preschool and basic upbringing alongside with military training) was oriented towards the ideal of "beautiful and good" (*kalos kai agathos*, in greek) man, i.e. harmonious person. Only the person whose soul and body were "healthy" has been acknowledged as free and full-fledged citizen. Attending so-called "gymnastic" (*gymnastikē*) schools was important to the integration of the youth into democratic society. In Plato's *Republic* we find a striking analogy: according to him, noble youth is "very like a well-bred dog in respect of guarding and watching"; he means that "well-bred dogs are perfectly gentle to their familiars and acquaintances, and the reverse to strangers", so young men which are being prepared to serve as guardians of the state must possess the same qualities (II. 375 a-d). In Greek society contests between sportsmen enjoyed great popularity and "gymnastic" education, of course, was permeated with "agonistic spirit", although Plato insists that this activity is truly valuable if and only if it develops sense of solidarity and social responsibility. Aristotle, in turn, treats this kind of education as an activity akin to the "theorizing" (or "philosophical contemplation"): both of them presuppose "leisure" (*scholē*) which is privilege of free citizen, and both of them "are to be valued for their own sake" (*Politics.* 1338a10-12). Otherwise stated: if young man cultivates sports *only* as a means to physical health or fame, he clearly reveals his "slavish" nature. Johan Huizinga's interpretation goes even further: according to him, athlete's anxiety for victory shows his deep involvement in the "play", but does not mark some external, material goal. Every form of "play" (including sophisticated disputes, warfare, athletics etc.) "is an activity which proceeds within certain limits of time and space, in a visible order, according to rules freely accepted, and outside the sphere of necessity or material utility... A feeling of exaltation and tension accompanies the action" (Huizinga 1970: 154). As John S. Mill points out, democratic principles of personal freedom and toleration are the main criteria for evaluating enterprises and deeds of rational individuals. Even such a brutal sport as boxing should not be banned – of course, with the stipulation that sportsmen realize the risks and are ready to feel consequences; educators cannot restrict pupil's freedom of choice – the task is to develop their ability for critical assessment (Patterson 186: 2481). One can hardly fail to notice that such educational politics requires tremendous efforts; prof. Robert H. Beck emphasizes the point: "Teaching democratically for democracy is the most strenuous teaching of all" (quotation from Beck 1951: 462).

In conclusion, philosophers acknowledge the relevance of democratic principles to sports education. This kind of education does not restrict only to physical training and involves formation of value-system. Essentially, it is not the process of imposing categorical imperatives and strict rules to the pupils or students, but the nourishing their social consciousness and promoting their self-determination skills.

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ON TEACHING VIRTUES IN "SOCRATIC MANNER"

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Our paper concentrates on Socratic conception of philosophy (which is originally represented in the *Apology of Socrates).* In his "defensive-speeches" Socrates distances himself from the previous (lonian) tradition of' natural philosophy" and makes it clear that precisely ethics is a matter of his concern. The method of philosophical method is being applied with regard to the issues of pedagogic.

There are key notions - viz. *philosophia. sophia. phronesis. arete. psyche* - which are used by Socrates to reflect and describe his lifetime investigations of a "human matters" and which. on the other hand, are the important categories of Greek mentality. The pivotal question of Socratic philosophy is the question about the nature or the essence of *arete* (virtue). Socrates emphatically links the care for the soul to the practice of discussion *(dialegomai).* Philosophical discussion initiated by Socrates is absolutely asymmetric: because of his specific epistemic stance ("I know that I know nothing") Socrates takes only the role of the questioner and immediately subjects interlocutor to thorough interrogation. Richard Robinson (1952) elaborates an idea that Socratic practice of the discussion (the interrogation. to be more precise) shows his intention to refute the thesis of the interlocutor without the aid of supplementary premises (i.e. to reduce the thesis to a self-contradiction), although, in fact, he cannot dispense with such premises. According to Gregory Vlastos (1991), Socrates' immediate objective is to convince an interlocutor that his primary thesis is inconsistent with his other propositions (i. e. extra premises) which he claims to be true, Moreover. Vlastos believes that the “socratic method” (so-called “standard elenchus”) does not confine to the refutation of the primary thesis; on the contrary, it is a “truth-seeking device”. Socrates is eager to show that if the primary thesis is false, then the negation of the thesis must be true; in other words, the elenctic discussion proceeds to the establishment of certain moral principles (positive truths). In early dialogues the interrogation always focuses on questions of "What is F?" type (e.g. “what is justice?”). Only the definition of *F* will satisfy Socrates and prove the competence of an interlocutor. Terry Penner (2005) insists that searching for definitions means occupying oneself with the facts of human nature or inquiring into “psychological states”. Quite frequently Socrates asks his interlocutors to say only what they really believe. How we are to interpret such a requirement? Vlastos take this requirement seriously and consider it as an essential rule of the Socratic educational method. If the immediate objective of this discussion is to reveal the inconsistency in the belief-set of an interlocutor, then it is vitally important for the accomplishment of this task to make him answer honestly. But Socratic method leads to the "Meno's paradox": we cannot inquire about either what we know or about what we do not know. Socrates tries to solve the problem by demonstrating that learning actually is recalling what our souls saw before their imprisonment in our bodies. Socrates' idea that knowledge is a system of logically interconnected propositions, is very important aspect of the demonstration (the "lesson of geometry" in which the uneducated slave-boy takes part), and this takes us back to the *Gorgias* where he figuratively says that conclusions of the elenctic discussion "have been clamped down and bound by arguments of iron and adamant". In the second part of the *Meno* "to know that *p"* means knowing that *p* is deduced from principles *q* and *r* (or *that p* has implications *q* and *r).*

To conclude, in the context of Socratic pedagogic learning (“recollecting”) is treated as the gradual development of systematic knowledge. The essential prerequisite for the effective ethical learning is the rejection of false believes and conceit.

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PHYSICAL TRAINING OF CANDIDATES TO PROFESSIONAL MILITARY SERVICE IN LITHUANIAN ARMY

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Introduction. Professional military service admits persons who meet the health requirements and who have fulfilled the established physical fitness standards. There is a_basic military training course (BMT) carried out in the Lithuanian Armed Forces. The aim of this course is to train soldiers for military service that they were able to perform individual tasks and acquire basic military preparation. The duration of the course is 12 weeks. **The aim the research** was to analyze the structure and content of the BMT programme and the effect of its implementation on the changes in physical fitness for would-be soldiers.

Material and Methods. The research sample included 250 persons who participated in BMT course in 2011. Physical fitness was assessed using the following tests: Bending and reaching arms in a lying position for 2 min (times), test for abdominal muscle strength - Sit ups for 2 min (times); endurance test – 3000m run (min. s). Functional capacity was assessed by the indices of Roufier test and maximal oxygen consumption (VO2 max) which was established indirectly, performing a step test. The testing was carried out at the beginning, in the middle and at the end of BMT programme. Eight control tests were performed: 8 km military march with 10 kg outfit: military obstacle course, grenade throw standing up, lying down. Kneeling, and speeding up, military self-defence first-level test, swimming and overcoming obstacles in the water.

At the end of BMT course would-be soldiers have to collect no less than 60 points .in each physical fitness test.

Results. BMT physical training programme has 120 hours, hours. The whole BMT course includes. Physical training course includes physical training theory (2 h), general physical training (50 h), and applied military physical training (68 h). General physical training includes learning correct performance of physical exercises (2 h), strength development (11 h), endurance development (12 h), flexibility development (9 h); speed and agility development (3 h), testing physical skills (12 h). Applied military physical training programme includes technical training of overcoming military section obstacles (9 h), preparation for a military march (4 h), training military combat self-defence actions (28 h), training combat grenade throws (5 h), training military swimming (8 h), applied military physical training testing (14 h).

During the first physical fitness testing only 27 percent of would-be soldiers met the standards of all three control tests (each exercise was evaluated in no less than 60 points), during the second testing – 90 percent, and during the last testing the number of candidates who performed in the tests successfully decreased to 88 percent. Candidates to professional military service demonstrated low indices of functional body capacity (poor Roufier test).The results of applied military physical training testing at the end of BMT programme were as follows: 99 percent of candidates carried out 8 km military march meeting the norms. 44 percent - grenade throws, 87 percent - overcoming military section obstacles, 60 percent - military combat self-defence, 80 percent - swimming and overcoming obstacles in the water.

Conclusions. Physical fitness of candidates to professional military service in the Lithuanian Armed Forces is poor. During the basic military training course physical fitness of candidates improved and at the end of the course. it reached the normative level of physical fitness. A majority of would be soldiers are still unable to meet some of the normative requirements of the applied military physical training at the end of basis military training course.

EXERCISE TRAINING IN PREVENTION OF SARCOPENIA AND DYNAPENIA IN ELDERLY: MYTH OR REALITY?

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The rate of muscle loss has been established to range 1% to 2% per year past the age of 50.as a result of which 25% of people under age of 70 and 40% over the age of 80 are sarcopenic (Marzetti.Leeuwenburgh.2006).The term sarcopenia has been defined as the age-related loss of muscle mass and dynapenia as the age-related loss of muscle strength(Clark.Manini.2008).Frailty due to sarcopenia and dynapenia are proved reasons for the loss of an active interaction with the environment and loss of independence in the elderly. and predicate the use of resistance exercise for purpose of increasing muscle strength.Aging – associated reduction in AMP-activated protein kinase (AMPK) activity may be a factor in reduced mitochondrial function in elderly (Reznick R.M. et.al.2007).

The purpose of the presentation is to analyze the reasons for aging skeletal muscle weakness.the role of sarcopenia and dynapenia in this process and to evaluate possibilities for prevention the development of muscle weakness and disability in the aging population.For this purpose we analyze possibilities of different exercise training strategies (endurance. resistance and concurrent endurance and resistance training) to prevent via development of decelerative effect of exercise training on aging skeletal muscle quantity and quality.

As lack of strength is one of the main reasons for muscle weakness. it seems to be most realistic to use resistance training for this purpose in the elderly as it is strong stimulus for muscle metabolism, particularly for the contractile machinery of muscle (Seene.Kaasik.Riso.2011).Contractile protein turnover rate depends on the oxidative capacity of muscle(Seene.Kaasik.Alev.2011) and muscle oxidative capacity decreases in the elderly(Seene.Kaasik.Riso.2011). AMPK is activated in response to endurance exercise.It is obvious that endurance training stimulates an increase in the oxidative capacity of skeletal muscle by an increase in mitochondrial biogenesis and supports faster protein turnover during resistance training as a result of which muscle function and thereby life quality in the elderly improves.

In conclusion: Concurrent strength and endurance training seems to prevent of skeletal muscle atrophy in elderly but the question is whether and what conditions AMPK blocks the activation of mammalian target of rapamycin complex-1(TORC 1) by activating the tuberous sclerosis complex-2 (TSC 2) during this training in elderly skeletal muscle. The strategy to work out concurrent exercise program in the elderly is complicated as it is unclear whether a muscle fiber is capable to undergo hypertrophy and maintain endurance capacity at the same time.

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MUSCLE WEAKNESS IN THE ELDERLY: EFFECT OF EXERCISE THERAPY

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Aging is a multifactorial process leading to changes in skeletal muscle quantity and quality, which cause muscle weakness and disability in the aging population. Decrease in skeletal muscle strength, contractile proteins synthesis rate, and increase in muscle protein degradation rate demonstrate that the contractile machinery in elderly is structurally and functionally damaged. Changes in MyHC isoforms' composition in skeletal muscle may be related to slower ATP splitting in the elderly because of decrease in muscle mitochondrial ATP production.

The purpose of the presentation is to analyze the biological and physiological mechanisms for aging skeletal muscle weakness, to evaluate possibilities of exercise therapy for decelerating the development of muscle weakness and disability in the aging population.

The decline in muscle mass primarily results from type II fiber atrophy and loss in the number of muscle fibers. Increased variability in fiber size, accumulation of non-grouping, scattered and angulated fibers and the expansion of extracellular space are characteristic to muscle atrophy. Beyond the loss of muscle size due to reduced fiber number and myofibrillar proteins that underlie muscle weakness in the elderly, impairments in neural activation have been found, as well as potential alterations in other muscular properties that may reduce contractile quality. The functional and structural decline of the neuromuscular system is a recognized cause of decreased strength, impaired performance of daily activities, and loss of independence in the elderly. Loss of muscle strength in older adults is weakly associated with the loss of lean body mass. It means that muscle weakness in older adults is more related to impairments in neural activation and/or reductions in the intrinsic force-generating capacity of skeletal muscle.

Skeletal muscle fibers have a remarkable capacity to regenerate and this depends on the number of satellite cells under the basal lamina of fibers and their oxidative capacity. In sarcopenic muscle, the decrease in the satellite cell pool and the length of telomeres might explain the higher prevalence of muscle injuries and delayed muscle regeneration.

Both sarcopenia and dynapenia are risk factors for health outcomes and play a significant role in the etiology of disability in the elderly. As a complex of factors contributes to the development of muscle wasting and weakness in the elderly, it is complicated to find one certain measure for rehabilitation. Lack of strength is one of the main reasons for muscle weakness, and it seems to be most realistic to use resistance exercise for this purpose in the elderly. Resistance exercise is a strong stimulus for muscle metabolism in the elderly, particularly for the contractile machinery of muscle. The contractile protein turnover rate provides a mechanism by which the effect of exercise-caused changes can be assessed in accordance with the needs of the contractile apparatus. As the contractile protein turnover rate depends on the oxidative capacity of muscle and muscle oxidative capacity decreases in the elderly, it is obvious that endurance exercise stimulates an increase in the oxidative capacity of skeletal muscle by an increase in mitochondrial biogeneses and supports faster protein turnover during resistance exercise, as a result of which muscle function and thereby life quality in the elderly improves. The regeneration of skeletal muscle from the damage caused by exercise is faster in muscles with higher oxidative capacity. Using both resistance and endurance exercise in the elderly makes it possible to modify the age-associated decline in muscle function and decelerate the development of muscle weakness.

SOMATIC ASPECTS OF SPORTMANSHIP SUMY UNIVERSITY ARCHERY TEAM

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Sport result depends a lot on morphologic features of the sportsman. They present one of the selective factors determining the sportsman's perspective [3].

Purpose of research is to determine body build peculiarities of the students involved in archery.

Object and methods of research. Object of the research was 28 students Sumy State University. The first group consisted of 10 students (18-23 years old) training in archery sports clubs. The second group consisted of 18 students (18-23 years old) of basic group physical culture.

For these research purposes such methods were applied - somatometric method, indices of physical development harmonicity for determination of body build peculiarities [1.4], statistic and mathematic methods[2].

Results of research and their discussion. One of the important features of the constitutional features of a person is body surface area. In the first group it was 381 ± 5.23 g \ cm. the second 375 ± 4.36 g \ cm.

As it follows from comparing 35 body build indices of university archery team and students of basic group, the sportsmen body weight is larger at 0.53% ($p < 0.05$), body length - 0.11% ($p < 0.05$), the upper segment of the body -1.84% ($p < 0.05$), middle segment of the body-0.43% ($p < 0.05$), the lower segment of the body - 0.18% ($p < 0.05$), length of the shoulder - 1.02% ($p < 0.05$), hip length - 0.65, shoulder width - 0.72% ($p < 0.05$), transverse diameter of the chest 0.64% ($p < 0.05$), antero-posterior diameter of the chest - 1.73% ($p < 0.05$), inspiratory reserve volume -0.25% ($p < 0.05$), expiratory reserve volume - 0.37% ($p < 0.05$), circumference of the shin in the narrowest part of 1.35% ($p < 0.05$); left hand dynamometry 0.17% ($p < 0.05$) - this is probably due to the sport. While the right hand dynamometry in the first group is less than the second group by 0.42%.

35 examined somatic indices correlate[5] with the level of sportsmanship and the training experience in archery- five of them correlate with a close estimate of the rank sportsmanship subjects, eight - at average, eighteen - at low, and four - at low level. Training experience correlate with somatic parameters: with three - on average, with fifteen - at low level and fourteen - at low levels.

Conclusions. Many years of sports training in archery, as well as selection of the most talented sportsmen, have significant influence on the structure of their bodies. Sportsmen who specialize in archery are characterized by large weight-height indices: the upper, middle, lower segment of the body, shoulder length, transverse diameter of the chest, anterior - posterior diameter of the chest. Selected indices of body build of sportsmen correlate with the level of sportsmanship and the training experience.

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MOST SUITABLE BALANCE TESTS FOR DIFFERENT AGE PEOPLE

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Different balancing test study is one of the current components, which are linked to the development and steady purposeful teaching model for maintaining and improving middle-aged and elderly people. Gerontology and anthropometric data was used in solution to the choice of tests to determine the static and dynamic balance of older people. The tests are used to explore the possible use of static and dynamic balance of different age, gender, the development of various movements, which are simple, certain, accessible and efficiently handle.

Methodology of the Study: Balance tests, static and dynamic balance determination were analyzed and studied, based on the literature and theoretical foundations, taking into account the anthropometric parameters (weight ratio) and gerontology (human physiological changes).
Static and dynamic balance tests were assessed which are geared to middle-aged and older people.
Determination of static balance:

1) Test using DBA platform

Results: balance middle index

40-50 years old on the left leg- 1.8; on the right leg-1.6
50-60 years old on the left leg-1.9; on the right leg- 1.8
60-70 years old on the left leg-2.4; on the right leg- 2.0

2) Romberg tests were compared to the standards which were invented by German professor Dr.Herbert Haag and Christian Kroger.
The results were the following:

40-50 years old- 21.04; 50-60 years old- 15.30; 60 and older- 15.26

Standard: Age	40-50	50-60	60-70	70-80
Men	19.60	19.60	17.50	14.30
Women	19.30	19.80	15.00	14.00

3) For dynamic balance determination the test called Star was used:

Excursion forward: on the left leg- 0. 63± 0.02; on the right leg- 0.67 ± 0.02
on the left leg- 0.807± 0.015; on the right leg- 0.866±0.015
Pearson's correlation coefficient- 0.791. Visible correlation is tight.
The results of increase on the left leg is 0.01; on the right leg is 0.02; forward and laterally- 0.01.
Excursion forward and laterally: on the left leg- 0.79± 0.02; on the right leg- 0.82 ± 0.05
on the left leg- 0.901± 0.022; on the right leg- 0.973±0.020
Excursion forward and medially: on the left leg- 0.71± 0.02; on the right leg- 0.807 ± 0.015
on the left leg- 0.76± 0.02; on the right leg- 0.821±0.013

Conclusion: All the tests mentioned above are meant for people aged 50, 60 and older. The tests where jumps are used are meant for people aged from 40-50.

PROCESS OF TRAINING OF GYMNASTIC EXERCISES ON THE BASE OF THEIR KINEMATIC AND PHYSIOLOGICAL PARAMETERS

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Technique training of gymnast supposes mastering of exercises of different structural groups to the virtuosity level. There are the most important exercises which require priority of being mastered and make the base of technique of all related ones in all these groups. Such exercises are the main (profile) ones. It is know from the previous researches that qualitative mastering of the main exercises is impossible without specific base technique training, which includes mastering of locomotor actions called the base skills. So, mastering of base and main exercises is one of the most important goals of technique training of gymnasts and its core.

The training process at the initial sport specialization stage is supposed to be more productive if the selection of means and methods of the gymnast training is based on the analyses results of kinematic parameters, during performance of gymnastic exercises.

In the study there were analyzed kinematics of performance of such exercises as acrobatic forward handspring, handspring vault, swing backward to handstand on parallel bars and giant circle on a high bar. Performance of these exercises was registered by digital video camera. In the course of further processing of video materials the program «Star Trace» were used. To study the gymnast's external breath parameters during performance of the exercises the telemetric ergospirometry complex «Oxycon mobile» by VIASYS and specialized software package based on Windows XP operating system was used. Two blocks of the device were fastened on the gymnast's back as a rucksack. The respiratory mask with the sensor of turbine type with low resistance to air stream was put on the gymnast.

The skill technique models were received as a result of analysis of their performance by 4 top class gymnasts. The training of young gymnasts was organized in accordance with the received model parameters of skills technique performance. 8 gymnasts aged 12-14 took part in the research. Their skills performance kinematics was also analyzed. The results of young gymnasts were compared with those of top class gymnasts.

The studies testified to positive dynamics of kinematics of performance of basic gymnastics exercises by young gymnast within training. The quality of performance of exercises increased during studies, proving effectiveness of model kinematic parameters of performance of gymnastics exercises in the process of learning.

The received data testify that the gymnast use monotype respiratory system work that characterizes identity of its work during performance of the main gymnastic exercises as giant circle on the high bar, swing to handstand on the parallel bars when the breath out phase coincides with the main phase of the performance of this exercises. Performing forward handspring gymnasts use two different models of the breathing system functioning. The former – the main movements are made breathing out to strain the skeletal muscles, to reinforce the power of the performance. The latter – there is a short breath holding during the exercises to exclude extra involvement of the muscles, which leads to muscle work minimization.

The analysis of kinematics of exercises performance and breathing system functioning promoted considerably precise monitoring of technique of exercise performance and allocation of basic mistakes in performance and recommendations on its elimination.

POST-EXERCISE HYPEREMIA AFTER STATIC LOCAL TYPE OF EXERCISING

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Introduction. Peripheral and systemic blood flow the intensity depends on intensity and duration of exercising. The aim of this study was to find-out peripheral circulatory changes of endurance athletes while performing a local static type of physical loads which vary in duration.

Methods. The subject of study was three groups athlete's adapted to endurance type of training. The first group (n = 17) performed 2-s measurement of maximal voluntary contraction (MVC). The second (n = 18) performed 30 seconds a static physical workload of 75 % of MVC. The third group (n = 22) performed static physical workload 75 of MVC to incapacity. After the physical load arterial blood flow was recorded up to 168 s in the first and second groups; and up to 305 s in the third group. After measurement of MVC a 20 minutes was designed for adaptation at rest (sitting on chairs ergography) and then arterial blood flow was recorded at rest and after exercising (4 s, 21, 36, 53, 77, 107, 142, 168, 196, 231, 257, 284, 305 s). The MVC measurements were repeated during the recovery with an interval of 3 minutes between them. MVC measurement was performed by pressing the foot pedal dynamometer gradually and when reached maximum size of efforts was hold about 2s. The blood flow in the calf was determined by venous occlusion plethysmography. Changes in the calf volume were determined with a modified Dohn's plethysmograph.

Results. After the first 2 seconds of measurement of MVC. arterial blood flow intensity Immediately after exercise increased from 4.3 ± 0.3 mL/100mL/min to 25.7 ± 2.7 mL/100mL/min ($p < 0.05$), and 77 s blood flow decrease to (3.6 ± 0.4 mL / 100mL/min).and it was below initial value. In subsequent measurement of blood flow to the intensity slightly lower compared to the initial level. The second and third largest measuring of the blood flow values was slightly lower than after the first measurement. Blood flow recovery after the second and third measurements were similar to the first measurement.

After the first static dosed physical load of 30 seconds, arterial blood flow increased from 2.6 ± 0.2 mL/100mL/min to 46.0 ± 2.3mL/100mL/min. and at 53 s were observed significant decrease in arterial blood flow and others subsequent measurements changes slightly, but the intensity was higher than initial level. After the second physical load the highest blood flow values were higher than after the first physical load. Blood flow recovery after the second and third measurements were similar to the first measurement.

Blood flow at rest was 2.7 ± 0.2 mL/100mL/min. and immediately after the first static load to incapacity, blood flow increased to 52.4 ± 3.3 mL/100mL/min. The highest arterial blood flow values were not immediately after exercise, but later (at 21 s). From 21 s to 142 s was intensive blood flow recovery, from 142 s to 305 s blood, hardly changed, but its intensity was increased 2-3 fold compared to baseline. After 20 minutes of the first physical load and before the second physical load the blood flow was significantly higher of initial level. The maximal arterial blood flow values were higher than after the first physical load. Blood flow recovery after the second physical load was similar to that which was after the first physical load.

Discussion. Arterial blood volume is one of the peripheral blood flow indicator that show how blood volume per time unit receives the testing segment. The biggest change in the intensity of arterial blood flow shows the needs of blood for working muscles. Increased blood flow and oxygen consumption, metabolic vasodilatation is the result, i.e., increases the oxygen supply to the muscles performing physical activity as to meet their needs. Thus, metabolic hypothesis submits that muscle blood flow depends on the activity of oxygen delivery to tissues. After short-term physical load, the biggest intensity of circulation was observed immediately after exercise, and after prolonged physical load, after (21 s). Later, the decrease of intensity of blood flow after exercising was observed. It was clear defined that post-exercise hyperemia depends on exercise duration. The relatively short duration of muscular contraction evoke the short-time but intensive increase of muscular blood flow.

ABILITY TO BREATHE IN AN UNFAMILIAR ENVIRONMENT AS A FACTOR SUCCESS OF PRIMARY TEACHING SWIMMING

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Proper breathing - is not only an integral part, but the key to successful mastering the skill of swimming. The right mix of breaths is determining the success of the process. If you do not learn how to breathe properly while in the water, you can not swim and a few tens of meters, not swallowing the water and wasted power.

Breathing while swimming is somewhat different from the everyday, to which we are so accustomed to the first days of life. The main difference is that the "land" we breathe nose (and the inhalation and exhalation), the "water" is a breath should be performed only by mouth, and exhale, which in most ways swimming is performed in water. is difficult because of resistance from the surrounding environment. That change this stereotype of breathing dedicated to the first training of children and adults attending swimming (Mosunov D.. 1998; Laughlin T.. 2003; Ford B.. 2009).

The purpose of this study was to clarify the importance of mastering the skill of breathing in an unusual environment for initial training swim.

The study involved students of the Lithuanian Academy of Physical Education (future coaches and physical education teachers) who have studied the discipline of "Swimming."

In the first phase of the study were conducted surveys of students who passed a training course swimming (29 women and 26 mans). The survey allowed to establish the number of students who have been able to swim before entering the LAPE; identify the students being in a pool, and their views on the importance of implementation of breaths in the water for the development of swimming technology, the ability to perform exhale into the water and the reasons that prevent to do it. Also found the number of lessons, which would be enough (according to the students) to develop the technique of breathing.

The second stage of the study was the teaching experiment, which was attended by the future teachers of physical training, conducted in October - November 2011. The students were divided into two groups. Lessons were held twice a week for six weeks. The first group studied by the usual method of swimming, the second - up to 40% of the time training was given breathing exercises. At the end of the course, swimming technique rated on a 10-point system adopted in Lithuania.

The results: According to information received 54% of respondents were able to respectively 46% - fail to comply with exhalations into the water. The main reason why the students immerse his head in the water and began to perform breath: discomfort and irritation of eyes and nose (31%). confusion and the possibility of drowning (starting to sink) (15%). a habit to keep his head above water (54%).

The results indicate that both groups of students have fully mastered a way to swim backstroke. Years of experience and data of other authors suggest that the technology for the development of swimming breaststroke, and crawl on his chest. a more extended period of time than for backstroke. It can therefore be regarded as quite natural that for the prescribed curriculum, not all students mastered the technique of those strokes of swimming: the first group is able to 52%, second 72% of the students. This study shows that accentuated breathing in an unusual learning environment allows students to quickly master the technique of swimming and sporting ways to feel safe while in the water.

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KINEMATIC ANALYSIS OF THE DIFFERENT AGE SWIMMERS FLIP TURN PERFORMANCE

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Flip turns is a very important part of the athlete's competition at a distance swimming event. As shown in the various Olympic swimming competitions a kinematic analysis of the turns time should affect the final result (Thompson et al.. 2000; Skyrienė ir kt.. 2004). Assuming that the turns take approximately 36% of freestyle race time in a short course (Thayer and Hay. 1984), and 31% in a 50m pool (Arellano et al.. 1994), it has been proven that the reserve gained due to correct turns, results in a clear difference in performance time.

The aim of this study was to evaluate kinematic characteristics of flip turn of different age swimmers under various conditions.

The study was conducted in 2011 LAPE pool. Twenty-four Lithuanian top-level swimmers were included in the study. Athletes' ages were from 12 to 22 years, the qualification of class I to Lithuania Master of swimming. Exploratory were divided into two age groups under 17 years old and over 17 years (adults). All swimmers filmed from side view underwater with underwater video system and one panning video camera above water. Before the start filmed in black, water-resistant marker, was concerned to note the left and right sides of the body of the hip, thigh, knee and ankle joints. Using SIMI Motion 2D still mode software selected temporal and kinematics parameters of Flip turns were obtained. Each swimmer had to turn the three tests in deep water, and three tests - a shallow, with at least 5 minutes apart. In a scene estimated the duration of these phases: proximity to the wall; rotation; contact with the wall, pre-stretch and grasp. The total turn time (7.5 +7.5 m) transient performance characteristics were determined using Adobe Premiere 2 program. Statistical analysis of survey data was performed using the SPSS PASW Statistics 18 program. The interdependency was measured using r-Pearson's correlation coefficients.

The results: the correlation data showed significant and high correlation values (from 0.62 to 0.96; $p < 0.05$) between duration swimming-in (7.5 m). swimming-out (7.5 m) and the total turn (15 m) time; wall contact time and duration of active and passive forces times (from 0.70 to 0.80; $p < 0.05$) between the legs bend index and wall contact phase of the active strength times (from -0.86 to -0.63; $p < 0.05$). It does not depend of the athletes' ages and cornering conditions of the turn. Different cornering conditions affect only the young athletes' kinematic parameters of the action.

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OBSTACLE COURSES FOR PRINCIPAL SKILLS FORMATION AND THINKING ASSISTANCE FOR 3 - 4 YEARS OLD CHILDREN

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Children starting their school-years lack principal skills knowledge and mental stability. Therefore they have difficulties when gaining skills and knowledge necessary for their future life. Relying on the studies carried out the author of this paper may claim that the main child's health development takes place between the age of 1 to 5 years and it is very important at that time that physical activities suggested are well considered and at the same time would develop the child's principal skills and contribute to one's thinking. Training principal skills is not a teachers' end in itself. a teacher should realize that principal skills teaching is closely related to the child's development's educational, biological, mental peculiarities as well as to the future life crossroads – going to school. It is not important just to involve children into physical activities, but it is important to make out something very special in every child, awaken these special talents, give children the opportunities to do something independently and to support them. Our research topic was Sport-obstacle courses for principal skills and thinking assistance in preschool educational institutions for 3 - 4 years old children. Relying on the research goal and the hypothesis the following enabling objectives have been proposed: 1. To find out the principal skills settings correlative interconnection; 2. To work out the obstacle courses' contents for principal skills formation and thinking assistance being founded on fundamental interconnections; 3. To find out the principal skills formation and thinking development evolution. In order to carry out the enabling objectives successfully the following research methods have been used: literature study; pedagogical experiment; observation analysis; statistical data analysis. For the defence of a thesis the following proposal has been put forward: the obstacle courses' contents will be based on principal skills correlative interconnection and thinking development.

Results: 1.We having found out the principal skills' correlative interconnections, one obstacle course has, been developed, in which the following principal skills have been included: crawling, running, jumping, throwing/catching, rolling, kicking and tasks on thinking. In the issue of the research, using Speakman's correlation 20 interconnections have been obtained. 2. Relying on the principal skills exercises' definite correlative interconnections: crawling, running, jumping, throwing/catching, rolling and kicking. In order to develop the principal skills and thinking 10 obstacle courses contents (4 principal skills exercises and 1 exercise for thinking development) have been designed. They have been included into sports lessons twice a week and each obstacle course has been repeated 3 times (30 lessons). 3. One of the physical levels of development indicator for pre-school pupils is an ability to implement various movements, principal skills: crawling, running, jumping, throwing/catching, rolling and kicking. Two settings with 3 criteria have been designed for each principal skill: high (10 points), average (5 points), low (1 point) and 3 criteria for the logical thinking: high (10 points), average (5 points), low (1 point).

We conclude those obstacle courses' developments principal skills formation and thinking assistance. If during the sports lessons obstacle courses' contents will be based on principal skills correlative interconnection and tasks on thinking, then it will facilitate principal skills perfection. The average increase in all principal skills and mental activity is statistically credible ($\alpha < 0.05$) and the confidence limit is 95%.

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IMPROVEMENT OF BIOSOCIAL SKILLS OF PERSONS WITH SPINAL CORD INJURY

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Research works of disabled biosocial skills are important and relevant evaluating perspective and possibilities of rehabilitation, psychosocial adaptation and socialization of disabled persons (Kennedy and others. 2010). Still there is a shortage of works analysing the effects of adapted physical activity on the independent living skills of disabled with spinal cord injury.

Aim of the research was to determine and evaluate the role of adapted physical activity in improvement of independence of persons with spinal cord injury.

Methods and organization. 36 disabled wheelchair users were under research carried out by methods of testing and experiment (7 female, 29 male). The participants were included into the research using the improbability objective method of group formation. The group consisted of persons with spinal cord injuries. The age range was from 18 to 45 years, and period after spinal cord injury was under five years. Biosocial skills of persons with spinal cord injury were evaluated in context of moving with the wheelchair and daily living activity skills. In research the test (Middleton and others. 2005) of functional independence FIM (Functional Independene Measure) and wheelchair control skills eveluating test were used. For testing movement and transffering skills a special equipment for wheelchair control skills improvement was used. Every movement controlling wheelchair control actions was evaluated in terms of help necessity from zero to two marks. The experiment was performed in 2009-2010. It aimed at analyzing the influence of adapted physical activity to biosocial skills of disabled after spinal cord injury using wheelchair. For experiment were selected similar in respect of age, sex, living conditions, independence and wheelchair control skills experimental and control groups. The experimental group consisted of 22 disabled using wheelchair which had been participated in adapted physical activity program and control group of 14 disabled using wheelchair non participated in adapted physical activity program. All disabled during the experiment (experimental and control group) stayed in Therapy and recreation center in Monciskes.

Results. The adapted physical activity program applied to persons with spinal cord injury had basicaly positive effect on biosocial skills in respect of wheelchair control skills: improve the experimental group almost all wheelchair moving skills (exept wheelchair manevrouing. keeping balance skills). improve the experimental group overcoming obstacles skills (exept overcoming minor obstacles skills). The adapted physical activity program had positive effect on biosocial skills in respect of daily living activity skills – improve persons with spinal cord injury transferring. moving. personal hygiene skills. Biosocial skills of control group were similiar before and after experiment. Research data shows. that persons with spinal cord injury are limited by their disability in fields of motion and independence. but directly improving these skills obvious results could be achieved. Obligatory conditions to achieve better biosocial skills is the competence and knowledge of pedagogics and positive attitude of participants to education process. For specialists working with spinal cord injuried persons it is recommended to individualize activities considering history time of disability while developing biosocial skills.

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BODY COMPOSITION AND PHYSICAL ACTIVITY (6-12 YEARS OLD CHILDREN)

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Introduction. Physical inactivity and sedentary lifestyles are known to predispose to overweight and obesity. These lifestyles are also known to track from childhood into adulthood with consequent cardiovascular and metabolic problems. This study aimed to describe the frequency of physical activity and the relationship between physical activity and body mass index of urban Riga (Latvia) school 6-12 years old children.

The prevalence of childhood obesity is increasing at an alarming rate. Many local governments have enacted policies to increase physical activity in schools as a way to combat childhood obesity (Harris, Kuramoto, Schulzer, Retallack**,**2012).

Childhood obesity is a major public health problem, given its increasing prevalence and adverse health consequences (World Health Organization. 2000).

The growing numbers of obese children, the proportions of children with BMI greater than the 10th, 50th, 85th and 90th continue to increase, which indicates an increase in weight for height across the entire population (Van der Sande et al 2001; Collins, Pakiz, Rock, 2008) se trends are likely to result in significant increases in the rates of coronary artery disease, hypertension, diabetes mellitus and other obesity-related diseases in young and middle-aged adults (Mahfouz et al.).

In 2008 the Centre of Health Economics Latvian children's anthropometric characteristics of the study states that the comparison of thresholds using WHO 2007 (BMI) standards, there was found that 12.8% of all children which were involved in the study, body weight was increased, but 8.1% of BMI values indicative of the obesity.

Methods: There were used the following methods in the study : BMI and body composition of the TANITA platform, pedometry – accounting of students' outrun steps during the day and test for the students' habit of physical activity.

Results: The participants were primarily elementary school children (n=240). The study took place from November 2011 until March 2012. The analysis showed BMI (Interrelationship correlation) with physical activity interventions.

Analysis showed that BMI correlation with physical activity interventions. We found changes in other measures of body composition.

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ARE CONCENTRICALLY-TRAINED ATHLETES MORE SUSCEPTIBLE TO ECCENTRIC EXERCISE-INDUCED MUSCLE DAMAGE COMPARED TO STRETCH-SHORTENING-EXERCISE-TRAINED ATHLETES?

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Unaccustomed or strenuous eccentric exercises result in prolonged impairment of muscle function. a disruption of the intracellural muscle structure and delayed onset muscle soreness and swelling (Clarkson, Hubal, 2002). These changes are typically considered as exercise-induced muscle damage indicators. Chronic concentric exercise training leads to reduced number of the sarcomeres in series and increased muscle susceptibility to eccentric contractions (Lynn, Morgan, 1994; Whitehead et al., 1998). Cycling is a non-weight-bearing activity with negligible eccentric contractions, which contrasts to running, during which eccentric contractions abound. Profound muscle damage is reported after long distance running (Kuipers, 1989), but evidence of similar pathology after endurance cycling events has not been published. Here we test the hypothesis that after a bout of eccentric exercise, elite cyclists have more severe muscle damage compared with long-distance runners, i. e. that long-lasting concentric exercise training renders the muscles more susceptible to damage in response to eccentric exercise.

Healthy untrained male subjects (UT. n=10. age 22.4 ± 1.7 years), long-distance runners (LDR. n=10. 24.4 ± 2.5 years), and road cyclists (CYC. n=10. 22.9 ± 3.7 years) took part in the study. All athletes were national team members. All subjects performed 100 eccentric isokinetic knee extensions at an angular velocity of 60° s^{-1} with their dominant leg. At each time point (at baseline. 2-3 min post and 48 h post exercise) the knee extension torque was measured in the following order during: 1) 20 Hz (P20) and 100 Hz (P100) supramaximal electrical stimulation; 2) maximal voluntary contraction (MVC); 3) concentric isokinetic contraction (IT) at an angular velocity of 30° s^{-1}. A change in P100/MVC ratio was used as an indicator of central fatigue. Also, muscle soreness and plasma creatine kinase (CK) activity were determined at 48 h after the exercise.

Most indirect indicators of muscle damage increased significantly ($p<0.05$) more in UT (immediately post exercise MVC decreased by 32% in UT, by 20% in LDR and by 25% in CYC; IT decreased by 24, 10 and 10%, P20 decreased by 29, 17 and 14%, and P100 by 14, 12, 9%, respectively), while there were no significant differences in muscle soreness and plasma CK activity at 48 h after the exercise between groups. Thus, we have established that 1) some indirect indicators of exercise-induced muscle damage (prolonged decrease in strength) but not other (muscle soreness and plasma CK activity) were more evident in UT as compared with endurance athletes; 2) for most indirect indices of muscle damage. CYC and LDR were not different, but stimulation torques (P20. P100) were reduced less in CYC immediately post exercise; 3) central fatigue immediately after exercise was higher in CYC than in UT and LDR. Thus our initial hypothesis was not confirmed: the concentrically trained cyclists were not more susceptible to eccentric exercise-induced muscle damage compared to stretch-shortening-exercise-trained runners.

In conclusion, even while elite endurance athletes are more resistance to eccentric exercise-induced muscle damage than untrained subjects, stretch-shortening-exercise-trained long distance runners have no advantage over concentrically-trained road cyclists.

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AGE-RELATED DIFFERENCES IN STANDARD AND VARIABLE REACHING TASK PERFORMANCE

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Motor performance deficits for elderly appear to be due to dysfunction of the neuromuscular, central and peripheral nervous systems. It includes coordination difficulty increased movement variability, movement slowing[1]. Additionally, studies have shown that with increasing age standard and variable motor task performance decreases[2]. Most studies are based on elderly subjects findings. So there is lack of information about middle-aged (MA) subjects motor performance capabilities.

The aim of this study was to reveal following questions: (1) whether MA group reaction time (RT), movement velocity (V), peak velocity (Vmax), and movement trajectory length (L) will be affected in variable task compared to standard task; (2) whether MA motor performance will be affected compared to young-adults (YA); (3) whether MA movement performance variability will be affected compared to YA.

Participants were divided in two groups: the first group consisted of 38 MA participants (19 female and 19 male; mean age (SD) 52.4 (4.6) yrs), and the second group consisted of 38 YA (20 female and 18 male; mean (SD) 23.6 (2.5) yrs)). Both groups performed two speed-accuracy reaching tasks with dominant right hand on the dynamic parameters analyzer of human leg and arm movement (DPA-1). Standard task consisted of 20 blocked goal-directed reaching movements, during which participants had to reach the same target, which appeared in the same place on the computer screen, and variable task which consisted of 20 reaching movements during which the target appeared randomly in three different places in same distance. After task performance we calculated data as means ± SD. To quantify the variability coefficients of variation (CV) were calculated by applying the following formula: CV = (Mean / SD)×100%. Statistical analysis consisted of two-way analysis of variance (ANOVA) with the between-subject factor age (YA. MA) and the within-subject factor condition (standard. variable). The significance level was set at $p<0.05$.

We have observed that in both motor tasks performance YA group showed significantly faster RT. greater V and Vmax, and longer movement L compared to MA group ($p<0.05$). Comparison of different tasks showed that both groups` RT and YA group V was faster ($p<0.05$), and no changes were observed at both groups` Vmax and L parameters, and MA group V compared standard to variable task (Table 1).

Table 1.

Values of measured middle-aged (MA) and young adults (YA) reaction time (RT), average velocity (V), peak velocity (Vmax) and movement trajectory length (L)

	Standard task				Variable task			
	RT. S	V. mm/s	Vmax. mm/s	L. mm	RT. S	V. mm/s	Vmax. mm/s	L. mm
YA	0.27*§ ± 0.0	131.90*§ ± 24.6	424.52§ ± 158.2	111.81§ ± 7.4	0.32§ ± 0.0	115.94§ ± 18.0	373.30§ ± 146.6	113.07§ ± 10.3
MA	0.32* ± 0.1	105.49 ± 17.1	272.41 ± 87.0	108.60 ±5.3	0.36 ± 0.1	98.65 ± 20.8	264.55 ± 91.0	110.96 ± 9.1

Values are mean ± SD; *$p<0.05$, as compared with values between different tasks, §$p<0.05$, as compared with values between different age groups.

In both motor tasks YA group showed significantly less variable RT and Vmax, and more variable V compared to MA group ($p<0.05$). No changes were observed at movement L. Comparison of different tasks showed that there was no significant effects of task on RT. V. Vmax and movement L in both groups (Table 2).

Table 2.

Values of measured middle-aged (MA) and young adults (YA) reaction time (RT), average velocity (V), peak velocity (Vmax), movement trajectory length (L) performance variability

	Standard task				Variable task			
	RT. %	V. %	Vmax. %	L. %	RT. %	V. %	Vmax. %	L. %
YA	12.78§ ± 4.1	34.23§ ± 5.3	15.00§ ± 4.2	9.03 ± 4.0	12.92§ ± 3.6	30.80§ ± 7.6	16.63§ ± 4.0	9.53 ± 4.3
MA	17.70 ± 5.7	28.55 ± 8.5	18.80 ± 9.1	8.48 ± 3.7	16.82 ± 6.1	28.69 ± 11.1	19.63 ± 11.1	9.72 ± 4.8

Values are mean ± SD; $^{\S}p<0.05$, as compared with values between different age groups

The main findings of our study are: (1) in MA group is affected movement V and Vmax during different tasks, they use same velocities for different tasks; (2) in MA group changes motor performance: their RT. V and Vmax slows down, however movement trajectory L improves. It shows that MA subjects uses more accurate strategy, meanwhile YA uses faster but less accurate strategy; (3) during both task performance MA shows more variable RT and Vmax, meanwhile V is less variable compared to YA.

The main conclusion of our study is that MA persons starts to use different motor control strategies, which affects motor performance and its` variability.

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IS THERE ANY GENDER-RELATED DIFFERENCES IN ATTENTION AND MEMORY? (PILOT STUDY)

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Most studies made at neurological and other researchers ignore gender-related differences in cognitive fun`ction (memory and attention). However, Ivanka (2010) states that the investigators should not ignore sex-related differences in any study of human brain function.

The purpose of the present study was to identify if current gender-related brain activity and structure differences affects attention and memory task performance.

The participation in the study was voluntary. Participants were divided in two groups: the first group consisted of 7 females (mean values (SD) 21.9 (1.7) yrs, 1.68 (0.05) m height, 56.5 (6.3) kg mass), and the second group consisted of 7 males (mean age (SD) 21.3 (0.5) yrs, 1.84 (0.05) m height, 82.6 (7.1) kg mass).

Both groups performed 3 short-term memory and 2 attention tasks on „Effecton Studio 2008“program. All tasks priority was chosen randomly. The initial subject's visit involved familiarization with experimental procedure and tasks. After subjects confirmation of tasks clarity a day later they returned to the Movement Fundamentals and Clinical Research Centre for the experimental procedure.

Short-term memory tests included:

1. “Recall a series of number” during which was shown seven numbers for 3 sec and then they vanished. Whereupon participants had to write these numbers down in the table which appeared after vanishing numbers. This procedure was performed 16 times. If participants wrote down correct number then program added one number, and if incorrect then it deleted.
2. “Recall a double-digit number” during which participants had to remember ten double-digit numbers, which were shown every 3 sec. After showing all numbers, participants had to write down it to the table. This procedure was performed 2 times.
3. “Recall the figures” during which participants had to remember shown nine figures for 15 sec. Then appeared 28 figures, from which participant had to recognize which were shown previously.

Attention test included:

1. “Attention variation test” (black vs red) during which participants had to collect red colored numbers from 1 to 25, and black coloured numbers from 24 to 1. Participant had to check first red coloured number then black coloured number and repeat it until last number (red coloured 25).
2. “Schultz table“ – reaction and velocity test. during which participant had to find and check numbers from 1 to 25. This procedure was performed 5 times.

After task performance we calculated data as means ± SD. Differences between different genders were evaluated using Student's (t) test. The significance level was set at $p < 0.05$.

Pilot study results showed that during “recall a series of number” test was no differences at mean remembered symbol amount, and correct answers percent. “Recall a double-digit number” test did not show any significant difference at correct number amount and percent. “Recall the figures” test showed the same remembered figures amount and percent.

“Attention variation test” showed that both gender make same amount of mistakes during same time. Additionally, “Schultz table” whole test time and average time of each table did not show any significant difference.

The main finding of our pilot study is that gender does not affect attention and memory. However it is important to recruit more participants in this study to make final conclusion, which will complement research performance studies.

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LITHUANIAN SPORT MUSEUM'S ACTIVITIES IN THE CONTEXT OF WORLD'S SPORT MUSEUMS

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Dana (2004) states that a museum must perform two functions: to teach and to promote. The sooner a museum will commence teaching, the sooner it will establish ties with the populace. In the smaller countries sports museums maintain the memories of athletic achievements in multiple branches of athletics, in large countries each separate branch has its own museum. In the USA these museums are often called Halls of Fame. Research objective: 1. To become acquainted with certain world famous museums' educational activities. 2. To reveal the educational activities of Lithuania's Sports Museum in Kaunas (LSM). 3. To compare these educational activities between them. Research methods: study available literature on museums' educational activities, discussions with museums' staff members, visitors, participants of educational programs and their organizers. Analyze information relative to Lithuanians athletes or names of Lithuanian ancestry found in these museums that have achieved fame in their respective sports careers. We also analyzed educational activities in museums, which are known for a specific branch of athletics. These include the International Swimming Hall of Fame (Fort Lauderdale, Florida), Basketball Hall of Fame (Springfield, Massachusetts), Football (American) Hall of Fame (Akron, Ohio), Baseball Hall of Fame and Museum (Cooperstown, New York) the Olympic Museum (Lausanne, Switzerland) and LSM. The Basketball Hall of Fame in Springfield, Mass. lists Arvydas Sabonis, from Kaunas, the International Swimming Hall of Fame lists Olympic champion from Vilnius Lina Kačiušytė. In the football Hall of Fame we find Johnny Unitas (Jonaitis) and Dick Butkus whose parents were from Lithuania. The Olympic Museum and the Baseball Hall of Fame and Museum are well known in the world, while Lithuanian Sports Museum is a popular attraction in Kaunas. Our research was organized as follows: we searched for computerized data on activities at the above listed museums and compared these activities with those of Lithuania's Sport Museum. We did not dwell on the Olympic Museum in Lausanne because Olympic Museums can be a separate subject for a conference presentation. It is worth mentioning that the Olympic Museum's web page gave us information on all branches of athletics, the origin of the Olympic Games and its founder De Coubertin. This museum occupies a multi-story building and in it the displays include Olympic champions' uniforms in which they competed as well as sports implements used to establish records and win medals. Olympic web pages point to sports museums in all corners of the world. Here we can find the location of Poland's Sports and Tourism Museum, Sports Museum of Finland, Estonian Sports Museum, Norwegian Olympic Museum, etc. Regretfully Lithuania's Sports Museum in Kaunas is not on their list. All of the museums we researched had web pages indicating their educational activities. It is understood that these museums organize scientific conferences and meetings between and for athletes and students. We found data showing that museums' facilities are made available for various civic needs. As we compare Lithuania's Sports Museum's activities with those from other countries we note that the LSM has substantial educational program. As an example, this museum organized 53 events in 2011. Also in 2011 Lithuania's Sports Museum was granted the Fair Play Prize and its Director, Pranas Majauskas was selected for the European Fair Play Prize in 2006.

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ANAEROBIC LACTATED EXERCISE INFLUENCE ON THE PARAMETERS OF POWER AND STRENGTH

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Introduction. As suggested by Harre and Leopold (1987), in speed endurance and short middle distance events, strength endurance is the speed strength support for these cyclic movements and therefore is a determinant of the competitive performance. Nummela et al. (1992) have studied the effects of fatigue on sprinters performing a 400m race. To evaluate the strength level decrease, the subjects performed a drop jump test (from 39cm height) after the end of each of the referred distances. Moreover, the authors found a linear negative relationship between jump height and lactate levels above 6mmol/l.

The aim of the study – to identify the influence of anaerobic lactated exercise on power and strength parameters change of 400 m runners.

Methods. The subjects was 400 m runners (n = 8; height 181 ± 4.6 cm; body mass 72.2 ± 4.4 kg). The study was carried out in indoor track and field (lap length 200 m) on January 10, 2011 Lithuanian university track and field championship. Subjects performed stretching exercise and participated in vertical and drop jumps (3 jumps. rest interval 1 min). After jumps participants performed warm up and then repeated vertical and drop jumps. After jump tests subjects participated in competition (400 m race, anaerobic lactated exercise). At the end of the 400 m race (after 3 min rest) subjects repeated vertical and drop jumps. During the competition there was used fully automated finishing system, which automatically turns on the starter being shot and automatically record the finish time. This finish system is certified by the IAAF. Noted that the running surface in indoor track and field was Regupol AG.

Results. Compared the values of 400 m runners results of the first and the last 200 meters we found statistically significant difference (2.09 s) ($p<0.05$). The height of vertical jump test after 400m race were significant reduced ($p<0.05$). After anaerobic lactated exercise (400 m race) there was significant reduce in power parameters (the height of drop jump test degreased 33.66 ± 9.88 %).

Conclusion. Anaerobic lactated exercise has the biggest influence on power parameters the height of drop jump test degreased 33.66 ± 9.88 %). Strength parameters (the height of the vertical jump) significantly decreased after 400 meters running ($p<0.05$).

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ANAEROBIC LACTIC EXERCISE INFLUENCE ON THE KINEMATICS PARAMETERS OF RUNNING

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Introduction. The 400 metres is usually known as a speed endurance event that demands a capacity to maintain close to maximum speed in an effort of ≈ 45 seconds duration. Researchers identifie the fundamental functional requisites for success in this event as a combination of optimal running stride charateristics despite fatigue, and plus an appropriate effort distribution (Sprague & Mann. 1983; Harre & Leopold. 1987; Vittori. 1991).

The aim of the study - to indentify the influence of anaerobic lacteted exercise on 400 m runners kinematic characteristics change.

Methods and research organisation. The subjects was 400 m runners (n = 8; height 183 ± 5.7 ± 5.1 cm; body mass 73.6 ± 3.8 kg). The study was carried out in indoor track and field (lap lenght 200 m) on February 12, 2011 Lithuanian university track and field championship. Subjects (n = 8) performed their warm up and participated in the race (400 m race. anaerobic lactated exercise). At the time there was a filmed runner's kinematic characteristic at 150 and 350 meters by TEMPLO Standart with 100 Hz BASLER A600f video camera. After that scene from TEMPLO Standart program was moved to the SIMI MOTION motion analysis program, where it was analyzed and calculated running step kinematic characteristics – contact length, stride length, frequency and estimated running velocity. During the competition there was used fully automated finishing system, which automatically turns on the starter being shot and automatically record the finish time. This finish system is certified by the IAAF. Noted that the running surface in indoor track and field was Regupol AG.

Results. Compared the values of 400 m runners running kinetic characteristics at 150 and 350 meter we found that anaerobic lactated exercise (400 m race), significantly affected (prolonged) stride contact time, reduced stride frequency and length in running distance respectively by 13.24%, 6.40% and 10.19% ($p < 0.05$).

Conclusions. 1. Anaerobic lactated exercise most of all kinematics characteristics influenced stride contact time, which increased by 13.66 ± 2.12%. 2. Stride length shortening had the greatest impact on running velocity reduction in the second part of the 400 m race.

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OXYGEN UPTAKE KINETICS DURING TREADMILL WALKING IN PRESCHOOL CHILDREN

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Introduction. The pulmonary oxygen uptake (pVO2) kinetic response at the onset of exercise provides a non invasive method of evaluating aerobic metabolism in muscles during growth and maturation (Armstrong and Barker. 2009). However, to date only limited research has been devoted to investigating the pVO2 kinetics during exercise in children. Therefore, the aim of this study was to compare the pVO2 kinetics during six minutes walking on treadmill in preschool children of different gender.

Methods. Preschool children (19 girls and 15 boys) participated in two consecutive treadmill exercises sessions separated be one hour. The mean age, height and body weight was 6.70 ± 0.38 and 6.79 ± 0.66 years, 1.23 ± 0.41 and 1.23 ± 0.50 m and 24.4 ± 3.6 and 24.3 ± 3.1 kg in girls and boys, respectively ($p>0.05$). During each session pVO2 data was collected at subjects rest and during walking (at 6 km/h and a 4% grade treadmill) for 6 minutes. The kinetics of pVO2 during exercise was analysed by applying mono exponential function.

Results. Slow component of pVO2 was no found in any groups of children during this mode of exercise. For the girls and boys the VO2 baseline value was 0.260 ± 0.042 and 0.274 ± 0.042 L/min. amplitude of pVO2 response was 0.564 ± 0.063 and 0.604 ± 0.053 L/min., time constant of pVO2 kinetics was 15.4 ± 2.2 and 15.9 ± 2.8 s. respectively (in all cases $p>0.05$). Absolute mean VO2 during third minute of exercise was significantly higher in boys group (0.818 ± 0.081 and 0.881 ± 0.092 L/min in girls and boys. respectively; $p=0.04$). However, there was no significant difference of this measure between groups at fourth min of exercise (0.875 ± 0.076 and 0.824 ± 0.076 L/min; in boys and girls respectively. $p=0.06$). Absolute mean VO2 at fifth min of exercise was significantly higher in boys group than in girls (0.890 ± 0.075; 0.830 ± 0.070 L/min in girls and boys. respectively. $p=0.02$). However, there no significant difference between groups of that measure at sixth minute of exercise (0.843 ± 0.072 and 0.889 ± 0.078 L/min; girls and boys. respectively. $p=0.09$).

Conclusion. The results of the present study indicate that pVO2 kinetics estimated using two treadmill walking sessions is similar in preschool girls and boys but girls tend to demonstrate better walking economy during steady state of exercise..

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THE INTERACTION OF ANTHROPOMERTICAL INDICATORS AND COMPETITION RESULTS FOR AQUATIC OLYMPIC FEMALE ATHLETES

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It is very popular these days to investigate anthropometrical, morphological indicators of various branches of athletics (1.2.3.4). We examined the relationships between elite athletes' anthropometrical indicators of four aquatic Olympic events for females and their respective competition results. Our investigation was directed at anthropometrical indicators of eighty Beijing Olympic Games of aquatic events who took part in the competition finals. Among them were 32 swimmers in 100 m of four competitive swimming styles, eight in the 10 km open water event. Sixteen athletes competed in synchronized swimming (duet competition). Sixteen participants were divers (3m and 10m platform) and eight were water polo competitors. We used athletes' anthropometric characteristics data such as height, body mass and body mass index, their age as well as their competition results. We determined the athletes' data averages (M), and their average standard deviation (SD). The student's t-test for standard samples was applied. Significance levels were set at $p \leq 0.05$. Pearson's correlation was used among athletes' body somatic measurements and competition results in swimming, diving and synchronized swimming. Mathematical statistical calculations were performed using Excel 2003 and SPSS17 programs. The obtained results show water polo players being the oldest athletes; the youngest were the 10m platform divers. There were no significant differences among swimmers ages with respect to their swimming styles. Athletes of the Beijing Olympic Games aquatic events have significant differences in somatic indicators. Among swimmers the biggest body height indicator was for backstroke style competitors (176.9±5.7cm). This indicator was significantly larger than for backstroke style swimmers (170.7±5.58 cm). Correlation coefficient between backstroke swimmers' age indicator and competition result was r=0.53. For free style swimmers r between age indicator and competition result was r=0.87. Freestylers' age indicator was 23.0±4.9 yr, years. It means that the older athletes had a better potential to swim faster in the competition events than the younger swimmers. Divers from 3 m platform r between age indicator and competition evaluation score was r=0.503. Divers from 3 m were 27.3±3.1 years of age. They were older than divers form 10 m platform (23.0±4.9 yr.). Correlation coefficient between synchronised swimmers' (duets) age and competition score was r=0.68. These athletes were alike in their age and anthropometrical indicators. Finally we determined that on the one hand the correlation coefficients between athletes' age and competition results are bigger than between their anthropometrical indicators and competition results. On the other hand, small correlation coefficients between anthropometrical indicators and competition results does not mean that anthropometrical indicators are not important for reaching the first places at the Olympic games in each appropriate branch of athletics. In such cases coaches and sport scientists would need to pay attention to the average means of athletes' anthropometrical indicators.

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THE INFLUENCE OF BODY SOMATIC INDICATORS ON ATHLETIC RESULTS FOR MEN AND WOMEN IN ICE DANCE COMPETITION

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We researched the relationship between athletes' body somatic measurements and the competition results for males and females. The obtained data of the 1-20 place athletes (male and female separately) at the Vancouver Olympics ice dance competition was taken from the internet (http://www.olympic.org/figure-skating). The athletes were divided into groups based on their gender and their taken places at the Vancouver Olympics: females placing 1-3, placing 4-20, placing 1-10, placing 11-20, placing 17-20 and placing 1-20. The next 6 groups consisted of males placing 1-3. 4-20. 1-10. 11-20.17-20 and 1-20. We used athletes' anthropometric characteristics data such as height, body mass and body mass index as well as age and sport results. In our investigation we used compulsory, original, and free program competition evaluation as well as the total points score. We determined the investigated athletes' data averages (M) and average standard deviation (SD). The Student's T-*test* for independent samples was applied. Significance levels were set at $p \leq 0.05$. Pearson's correlation was used among athletes' body somatic measurements and competition results in the compulsory, original, free programs and the point score in the total programs. Mathematical statistical calculations were performed using Excel 2003 and SPSS17 programs.

Table

Presents correlation coefficients among ice dancers' (female. male) competition score and athletes body somatic indicators.

Ice dance programme	Gender	Age/Score	Height/Score	Weight/Score	BMI/Score
Compulsory	Male *Female*	0.58 *0.44*	-0.46 *0.22*	-0.18 *0.37*	-0.13 *0.35*
Original	Male *Female*	0.42 *0.27*	-0.40 *0.09*	-0.18 *0.28*	0.10 *0.27*
Free	Male *Female*	0.42 *0.26*	-0.40 *0.05*	-0.11 *0.28*	0.04 *0.37*
Total	Male *Female*	0.40 *0.31*	-0.43 *0.10*	0.40 *0.31*	0.04 *0.34*

Investigation of ice dancers' indicators show that the women's average age was 25.9± 3.6 years, men's average age was 26.7± 4.04 years. Females were164.1±5.3 cm tall, males were 179.2± 5.5 cm. There were no significant differences among body height indicators depending on athletes' taken places at the competition. Nevertheless we noticed the tendency, that Olympic Games prizes winners' body height was bigger than the body height of other athletes'. Negative correlation coefficients between males' body height and competition results and positive correlation coefficients between females' body height and competition results show that difference in body height for competition pairs (between male and female) could be less than 9.7 cm. Athletes' age is a very important factor for elite competition performance in ice dance.

NEW ASSESSMENT METHODS OF MASTER SWIMMERS' RESULTS

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Swimming for sports masters is one of the most popular branches of sport: world and European championships attract more than several thousands of 25–100-year-old participants who are divided into 14–15 age groups. International Swimming Federation FINA recommends to covert the achieved results into relative points. With the swim time (**T**) and the base time (**B**) in seconds the points (**P**) are calculated with the following formula: $\mathbf{P = 1000 \times (B/T)^3}$**.** The base times are defined for all common individual events and relays, defined every year, based on the latest World Record that was approved by FINA. However, athletes improve world records, and thus different base times are defined according to them. For this reason the "weight" of a point assessing the result alters.

Research aim was to carry out mathematical modeling on the dependence of sports results on athletes' age, gender and swimming type. The study was organized on the basis of the statistical analysis of the best male and female master swimmers' results of 1993–2010, the tendencies of changes in results (www.fina.org. Statkevičienė, Gulbinas, 2007). mathematical modeling of 2005–2010 of the dependence of changes in male and female master swimmers' sports results on their age.

Results. After the analysis of more than 30000 master swimmers' sports results of the last five years in different distances and types of swimming, statistical models of changes in results were established with error not exceeding 1%. Instead of the base time (B) mentioned above we used the average values of the best results of master swimmers aged 15–29 years in 2005–2010 in corresponding groups of 10. This enabled us to decrease fluctuations in converting swimmers' achieved results. Results were given in seconds and not in points. For the practical application of this method, tables for converting results were made up with divisors of sports results in each age group of athletes. The achieved result **(R)** was divided by a certain conversion ($\mathbf{K_K}$) coefficient, and the reduced result ($\mathbf{R_R}$) which could be compared among athletes was found: $\mathbf{R_R=R/K_K}$. We suppose that every four-five years it is worth checking and correcting the conversion coefficients according to the new accumulated data if necessary. When the data are converted in different age groups, it is not difficult to compare them and to find out absolute winners of the events regardless of their age group. On the basis of our mathematical models, master swimmers' club "Park Ridge Penguins Master Swim Club". (Illinois. USA) presented freely accessible calculator for the conversion of results on their homepage http://www.parkridgepenguins.com. This method was also verified at the Open Lithuanian Swimming Championship.

We established that the suggested methodology would enable comparing swimmers' results in all age groups achieved in different years; the dependence of changes in master swimmers' sports results on age were described mathematically, which allowed establishing absolute winners of the event; convenient tables for converting coefficients were made for all swimming events; converted results were expressed in conventional units of time and not in points of relatively variable value.

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THE EFFECT OF HORSEBACK RIDING ACTIVITY ON THE SYMMETRY OF PASSIVE MECHANICAL PROPERTIES OF MUSCLES OF ADVANCED PERSONS WITH AND WITHOUT CEREBRAL PALSY

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The aim of the research: to investigate the effect of horseback riding activity on the symmetry of passive mechanical properties of muscles of advanced persons with and without cerebral palsy. Material and methods: 15 subjects (3 males. 12 females) from 6 to 27 years of age (18.6±5.53) participated in this research. In the first group (HT), there were 10 (aged 20.4±4.78) advanced females without physical and movement impairment. In the second group (CP), there were 5 subjects (4 boys. 1 girl; aged 15.2±5.76), who had cerebral palsy and were regular participants of therapeutic horse-riding. The research was conducted Horse Riding Centre of Kurtuvėnai Regional Park in July-August, 2011 (Lithuania). We assessed the asymmetry of passive mechanical properties (oscillation frequency. elasticity (logarithmic decrement) and stiffness) of the left and right sides of the lumbar erector spinae (ES) and gluteus medius (GM) muscles by using MYOTON-3 (University of Tartu, Estonia) before starting the horseback riding session (pre-test 1) and after the session (post-test 1). The duration of the riding session was 30 minutes.

Results: Both children with and without CP have a certain asymmetry of muscle mechanical properties. While investigating all the children, we did not find any statistically significant difference between children with and without CP; neither did we find any significant difference between the asymmetry of mechanical properties at the beginning of the research and after the horseback riding session.

The asymmetry of the GM muscle stiffness decreased while lying by 18% after the horse-riding session, whereas it increased while sitting and standing by 11% and 38% correspondingly. After the last session of horse-riding the stiffness asymmetry while lying was 14±10.0 %, while sitting - 17±11 %, and standing - 18±13 %. The asymmetry of logarithmic decrement decreased under the impact of riding while lying by 12% and sitting – 33%. The asymmetry of GM muscular tone decreased under the impact of riding while lying – 14%, sitting – 23% and standing – 29%. The results of GM muscular tone asymmetry obtained after the last riding session (while lying 12±3 %. sitting 16±7 %. standing 12±5 %) revealed that the riding reduced the asymmetry of the tone of musculus gluteus medius.

The asymmetry of ES muscular tone under the impact of riding also decreased while lying by 20%, whereas it increased while sitting and standing by 31% and 10% respectively. After the last horseback riding session, the obtained results of the ES muscular tone asymmetry were as follows: while lying 12±8 %, sitting 22±11 % and standing 28±22 %. The asymmetry of logarithmic decrement under the impact of riding decreased while lying by 25%, sitting – 32%, where it increased while sitting – 52%. After the riding session, the ES muscular tone asymmetry increased (while lying - 47 %. sitting – 5 % and standing - 18 %) more than of the asymmetry of GM tone. After the last session of horseback riding, the asymmetry of ES stiffness was as follows: while lying 21±9 %, sitting 20±9 % and standing 32±28 %.

Summarizing the results, it is maintained that horseback riding is an effective form of physical activity, which helps to reduce the tone of the tight GM muscle, increases elasticity, the stiffness of the relaxed ES muscle, increases its elasticity (with the exception of sitting). On the other hand, the asymmetry of the relaxed and tight ES muscular stiffness and (tight) tone increased.

Conclusion. Horseback riding helps to reduce the asymmetry of GM passive mechanical properties, whereas ES is reduced only partially.

Key words: horseback riding, symmetry, passive mechanical properties, cerebral palsy.

ADOLESCENT ATHLETES' PROSOCIAL BEHAVIOR RELATIONS IN SPORT CONTEXT AND REGULAR LIFE

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Introduction. Sport by nature is a social context, in which participants interact with, relate to, and influence, each other. Because of its social nature, sport provides ample opportunities for acts that have positive consequences for others, such as helping an injured opponent and supporting a team-mate after his or her poor play (Kavussanu, 2008). However field studies shows, that in a sport context athletes consequently engage in more antisocial behaviors then in regular life (Bredmeier, 1995; Bderemeier, Shields. 2001). On the other hand it doesn't prove yet that in a sport context sportsperson ship isn't available and values couldn't be educated. In this regard research on athletes prosocial behavior becomes more important as it shown in presently conducted studies on morally relevant behavior that occurs in sport (Kavussanu, 2006; Boardley, Kavussanu, 2008; Kavussanu, Boardley, 2009). Relations among prosocial behavior in regular life and sport context worth of investigation because recent studies constantly shows differences in behavior that occur in sport and regular life. We would like to emphasize that there is a lack of such studies although research on adolescents prosocial behavior is ample (Carlo, et al., 2003; Carlo, Carlo et al., 2007; Carlo et al., 2010). Based on arguments stated above we hypothesize that prosocial conduct in sport context will be positively associated with prosocial act forms like Dire, high emotional situations and responding to ask of help.

This study **aim** is to examine relationships among regular life prosocial behavior forms and prosocial and antisocial behavior in sports.

Study involves 140 team sports athletes, sample drawn from Kaunas city sport schools by applying convenience sampling method. Age of participants (M= 15.8 SD=1.23) male (n=72) and female (n=68). Distribution according sports: Basketball (n=57). Soccer (n=43). Handball (n=40). Participants were asked to fill out the questionnaires measured prosocial and antisocial behavior in sports 20-items (Kavussanu ir Boardley. 2009), and prosocial behavior in regular life 21-item (Carlo. et al., 2003 *(PTM-R)*).

Results. Factor analyses revealed two factors representing prosocial behavior (with teammates α=0.83and opponents (α=0.81) and two factors representing antisocial behavior (with teammates α=0.84 and opponents α=0.90). Estimating data in regular life prosocial behavior scale it was found three dominant factors. One is representing prosocial acts such as Dire, high emotional situation and responding to ask of help, second selfish prosocial act and third anonymous prosocial act. Test results of Internal consistency of the scales was (0.62 to 0.80).

We have found relations among prosocial acts dire, high emotional situation and responding to ask of help and prosocial behavior towards team mates ($r = 0.34$; $p<0.01$), and with opponents ($r=0.22$; $p<0.05$). Correlation was established for anonymous prosocial acts and prosocial behavior towards opponent ($r=0.40$; $p<0.01$), also selfish prosocial acts were positively associated with antisocial behavior towards opponents ($r = 0.3$; $p<0.01$).

Established correlations confirmed our hypothesis the prosocial conduct in sport context is positively associated with prosocial act forms like dire, high emotional situations and responding to ask of help.

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OLYMPIC EDUCATION AND ADOLESCENT ATHLETES' PROSOCIAL AND ANTISOCIAL BEHAVIOR IN SPORT

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Purpose: to determine the impact of the Olympic education on pro-social and antisocial behaviour of doing-sport adolescents in sport activity. As the value of victory is very important in modern sport (Genys. 2011), it is not always reached in a fair way (Mohammadi, Keyvan. 2011). Thus, the philosophy of Olympism is still relevant as basis for the Olympic education. The philosophy of Olympism is both oriented to a sportsman and every person, both to a short period and the whole life, both to a competition and victory and participation and cooperation, both to sport activity and improvement of a personality and social life. Olympic education is evaluated as nurturance of values during which the Olympic Movement. Olympic ideals and values are introduced and it is tried to apply them both for sport and daily activity (Zukowska, Zukowski, 2010). In this context, a hypothesis is raised that the expression of behaviour of doing-sport pupils in sport activity will be different depending on the fact whether the integrating programme of the Olympic education is applied in their school or not.

Method. The sample (n=2335) was drawn from Lithuanian schools by applying stage sampling methods, 1186 pupils from the schools participating in the programme of the Olympic education and 1149 from those not participating in this programme. In this research, only the data of doing-sport pupils were analyzed (n=747; n_{girls}=265; n_{boys}=482). i.e., that of those pupils who indicated during the survey they regularly attended sport trainings and participated in competitions. Prosocial and antisocial sport behaviors were measured using the 20-item Prosocial and Antisocial Behavior in Sport Scale (Kavussanu & Boardley. 2009). Participants were asked to report on a scale anchored by 1 (*never*) and 5 (*very often*) how often they engaged in the behaviors during the season. Factor analyses revealed two factors representing prosocial behavior (with teammates α=0.87 and opponents (α=0.77) and two factors representing antisocial behavior (with teammates α=0.87and opponents α=0.92).

Results. Adolescents athletes reported prosocial behavior with teammates the most (M=3.66. SD=1.01), followed by prosocial behavior with opponents (M=2.85. SD=1.07), antisocial behavior with teammates (M=2.09. SD=0.94) and opponents (M=2.00. SD=1.01). Girls scored significantly higher than did boys on prosocial behavior with teammates ($p<0.01$), opponents ($p<0.05$), and significantly lower on antisocial behavior with teammates ($p<0.001$) and opponents ($p<0.001$). When the Mann-Whitney statistic was calculated, the statistically significant difference was found comparing the expression of behaviour of doing-sport pupils from those schools that participate and do not participate in the programme of the Olympic education in sport activity. Adolescents from schools in which integrated Olympic education programme was applied scored significantly higher on prosocial behavior with teammates ($p<0.01$), and lower on antisocial behavior with opponents ($p<0.05$). After separately comparing the results of girls, analogical differences were found while evaluating the data of pro-social behaviour, but no statistically significant difference was found while evaluating antisocial behaviour in sport. In the groups of boys, there was no statistically significant difference while evaluating their pro-social and antisocial behaviour in sport.

Conslusions. The results of the research confirmed the raised hypothesis. In sport activity, pro-social behaviour is more characteristic and antisocial behaviour is less characteristic to those doing-sport pupils in whose school the integrating programme of the Olympic education is performed.

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ATTITUDE OF FIRST YEAR STUDENTS OF KAUNAS UNIVERSITY OF TECHNOLOGY TOWARDS USING DOPING IN SPORT

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The purpose of the study is to determine the attitude of first year students of Kaunas University of technology towards using doping in sport. Doping is defined as the use of alien to the body or physiological substances in abnormal amounts, applying of illegal methods to a healthy person to artificially and unhonourably improve athletic performance. Doping is a preparation that stimulates or suppresses organism's physical and mental state to temporarily improve athlete's performance (Sporto terminų žodynas. 2002). It was determined that young people going in for sports have better knowledge on doping use than those who do not, what is more, most schoolchildren and students going in for sports have negative attitude towards doping use (Chester et al.. 2003). Research conducted in Lithuania (Drazdauskas et al. 2005) revealed that most future sports educators (students of Lithuanian Academy of Physical Education) realize the harm of doping, emphasize its negative effects in sports but at the same time they believe that doping is the key to the best athletic performance these days.

Methods: analysis of literature, questionnaire survey. The survey was done in January. 2012. Questionnaire consisted of 22 half-open questions (Drazdauskas et al. 2005). 340 first year students of Kaunas University of technology were chosen as respondents. During the time of research 57.1% of respondents went in for sports for their own pleasure. 26.2% went in for sports systematically and took part in the competitions. 3.2% were professional athletes.

Results. The researches revealed how well informed on doping issue are the students. Only a small part of respondents did not know anything about doping (3.9–11.7%). 9.9% of females and 14.9% of males agreed to the statement that „Doping is banned preparation that is crucial in order to achieve the best results in sports these days". More females (55.9%) than males (43.1%) claimed there are too few discussions in society on doping use in sports ($p<0.05$). Almost all first year students of Kaunas University of technology who go in for sports (98.3% of females and 97.7% of males) do not use banned preparations. Both they and their training friends do not use any agents to improve their performance (36.3–45.8%). In order to do so they apply innovative training techniques (21.1% of students) or take vitamins and other legal medicaments (34.2%). Most of the respondents did not agree with the statement „The most important thing in sports is medal or record and it doesn't matter by what means this is achieved", however more than half of respondents do not agree that the athlete should be disqualified for life for using doping.

Discussion. Most of the first year students of Kaunas University of technology know what is doping, they understand its harm and what negative effects it brings. According to respondents high athletic performance can be achieved without using doping, but at the same time they believe that in such sports as track-and-field, cycling or culturism high performance depends on doping use. Researches conducted by other authors reveal slightly different findings (Drazdauskas ir kt.. 2005). It was determined that most students of Lithuanian Academy of Physical Education believe it's not possible to achieve the best sporting results without using doping. The findings of our research matched the findings of other authors (Drazdauskas ir kt.. 2005; Posiadala et al.. 2009) that state it's necessary to improve knowledge on doping use and its negative effects.

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"KAUNAS REGATA…": PROSPECT FOR INCREASE OF KAUNAS DISTRICT COMPETITIVENESS

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This paper investigates the impact of the event "Kaunas Regata…" (Kaunas Regatta) on the competitiveness of Kaunas City. The interview was conducted with the organiser of "Kaunas Regata…" and a questionnaire survey of the participants of this event was hold. The researches showed that the event itself is competitive; the participants are satisfied with it; the event is broadening; however, if to take into consideration the answers of organisers, the doubts are cast upon the impact of the event on the city competitiveness in future.

Some time or other, any enterprise, service, tourism sector, employees or city will have the competitors. Competition (in Latin - Concurentia) is a contest between manufactures, users and other economic entities for markets, goods and other resources (International Words' Dictionary – TŽŽ, 2008). Therefore, at the present time, only the ones, who posess good knowledge of market and able to present something original and acceptable for public, may survive in the competitive business. The global processes occurring in the modern society motivate the scientists and practitioners from around the world to pay more and more attention to the notion of competitiveness. The issues of competitiveness become the integral international, national and sub-national (regional and local) public administration levels. Not only business organizations, but also countries, regions and cities strive for being competitive in order to survive on the new global market formed by the information and knowledge-based economy and in "new competitiveness" (M.Best. 2001). The cities compete with each other in different fields and one of the most important fields, especially in certain regions, is tourism. As to the present paper, it investigates the impact of sports tourism on cities and. more specifically, the impact of "Kaunas Regata..." on the competitiveness of Kaunas District.

The subject of the research*:* The increase of the city competitiveness.

The aim of the research*:* To assess the impact of the event "Kaunas Regata..." on the increase of competitiveness of Kaunas District.

The tasks of the research*:* 1. To discover the notion of city competitiveness. 2. To study the impact of the event "Kaunas Regata..." on the increase of city competitiveness from the viewpoints of organisers and participants. **The methods of the research***:* analysis of scientific literature sources, interviewing, questionnaire survey.

The competitiveness of cities may be analyzed in terms of very different objects: undertakings, services.ourism sector, employees, rural areas, region, country, etc. In fact, the national (and supranational) policy, the economic activity structure of the country, the level of innovations, the national tax policy, the human resources development, the tariffs, the macroeconomical and industrial initiatives,

the other public policy conditions, the level of accessibility, the labour force educational level and other have a great effect on the cities and the results of their activity. As it was thought before, the cities cannot be competitive in general. In reality, their competitiveness is connected with separate fields. It is impossible to compare the cities that have nothing in common. The cities compete in order to increase their attractiveness for potential target markerts, modern infrastructure, high technologies and innovative activity. The localities also compete so that to increase the quality of life and the standards of environmental conditions to be attractive as tourist attractions. In Lithuania, yachting is a seasonal sport; however, it is gaining in popularity from year to year.”Kaunas Regata...“ brings together quite a lot participants; however, wishing to organise an efficient event, it is essential to know your particular participant. According to the data collected from the analyzed literature sources and the questionnaire survey, one may state that entertainments that attract not only the participants, but also the spectators, are of prime importance for organization of a yachting event. It is essential not to forget about the sport tourism that contributes both to the event success and the country or city economy. It is important to provide separate space for children, adults, tourists, etc. During the research, the benefit of the event for the business sector and the city representation promotion was found out and underlined. During these events, the participants arrive with their families and friends. In case they are provided with a full package of services, the possibility to have constant visitors of regatta and city emerges. While conducting the research, we may see that the event itself is competitive, the participants are satisfied with it and the event is broadened; however, according to the responses received from the organiser, the doubts are cast upon as regards the impact of the event on the city competitiveness in future. A clear event strategy as to how to survive on the market has not been designed. Broad consideration was not given to the issues of economic benefits provided by this sport for its fans and sports bases, as well as, for the city. Therefore, for the present, the event contributes to the city competitiveness; however, with the increase of the entertainment offer and expansion of the sports tourism sector, without its uniqueness. “Kaunas Regata...“ may become uninteresting and non-competitive as an event and a city element. Much work has to be done in that direction. With the help of good managers, business sector and municipality, “Kaunas Regata...“ may become a hallmark of Kaunas city and contribute to the stengthening of the Kaunas city competitiveness.

Key words: competitiveness, yachting, sports tourism.

PECULIARITIES OF BULLYING AMONG ADOLESCENT ATHLETES AND GROUP OF RISK ADOLESCENT

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Introduction. There is lack of scientific data referring to comprehensive research of bullying features among different social adolescent groups. Some researchers indicate extreme aggression in both groups of adolescent athletes and risk adolescent, referring to the personal status in the group, triggering behaviour of initiator of bullying or neutral behaviour. These people also tend to have higher social status among their peers which may lead to them being initiators of bullying or not participate in bullying process at all (Caravita et al., 2009). **Purpose** – to reveal peculiarities of bullying among athletes and group of risk adolescent.

Research participants. In the interview, which was carried out in the years 2010-2011 participated 203 13–16 year adolescent from various Lithuanian schools. Researched were divided into two groups: first group – athletes adolescent, second group – group of risk adolescent.

Research methods. For the researched there was provided questionnaire, prepared based on the United Kingdom York city *Bullyings questionnaire for schoolboys/girls*. (http://www.state.de.us/attgen/main_page/teachers/bullquesti.htm). For the relation between variables analysis we used non parametrical statistical associational analysis χ^2 method.

Results. More than two thirds of pupils experience bullying. Over three thirds of adolescents aged 13 to 16 bully others. Pupils of day centers experience bullying more often than pupils of sports schools ($p<0.001$). No link between extracurricular activities and frequency of initiation of bullying has been found ($p>0.05$). Frequency of initiation of bullying is linked to such factors as gender ($p<0.05$) and age ($p<0.05$). Boys bully their peers more often than girls ($p<0.001$). Older pupils bully their peers more often than the younger ones ($p<0.002$). No link between experienced bullying and gender or age has been found ($p>0.05$). Experience of bullying is linked to initiation of bullying ($p<0.001$). Relationship between these two phenomena is related to such factors as gender, age, and extracurricular activities. The link between experienced bullying and initiated bullying has been established for both girls ($p<0.006$) and boys ($p<0.003$), for both younger subjects ($p<0.001$) and older subjects ($p<0.028$), for both those - group of risk adolescent ($p<0.028$) and athletes ($p<0.017$).

Discussion. The current research confirms the data of existing researches (Kurtyilmaz & Can, 2010) that bullying widely spread among adolescent groups. Some researches indicate that boys are engaged in bullying more frequently than girls (Zaborskis ir Vareikienė, 2008). Other researchers find no significant differences between boys and girls (Povilaitis ir Jasiulionė, 2008), as confirmed by the current research as well. Participants of day centers experience bullying more frequently than adolescent athletes. Researchers indicate that sports activities is one of main reasons providing positive results in

development of moral values, communication, social and individual behaviour (Laskienė, 2010). Meanwhile, risk groups usually provide extreme aggression, resulting in aggression and bullying against themselves (Bruyn & Cillessen, 2006).

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DIETARY SODIUM CITRATE SUPPLEMENTATION ENHANCES RECOVERY FROM RAPID BODY MASS LOSS IN TRAINED WRESTLERS

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Rapid body mass loss (RBML), which is widely practiced by wrestlers before competition, is associated with dehydration and changes in acid-base balance and may negatively affect physiological function, physical performance and mood state [3]. However, official weigh-in takes place *ca* 12–18 hours before the beginning of the competition. Previous research has revealed that ingestion of alkalizing agents may have significant impact on body hydration status, body mass and physical performance [1. 4]. The aim of this work was to assess the effects of dietary sodium citrate (CIT) supplementation on physiological functions, affective state and physical performance during 16 h recovery from 5–6% RBML in trained wrestlers. Sixteen wrestlers performed an upper body intermittent sprint performance (UBISP) test [2] in three conditions: before and after RBML and following 16 h recovery from RBML. During recovery, the subjects ate a prescribed diet supplemented with CIT (600 mg · kg^{-1}; CI group. n = 8) or placebo (PL group. n = 8) and drank water *ad libitum*. RBML reduced ($p < 0.05$) mean power, blood pH. HCO_3^- concentration and base excess and increased urine specific gravity (USG). The reduction in mean power was associated with changes in plasma volume (PV) (r = 0.649; $p = 0.006$) and USG (r = –0.553; $p = 0.026$). General Negative Affect (GNA) and General Positive Affect (GPA) scores tended to increase and decrease, respectively. During 16 h recovery, increases in body mass (BM) and PV were greater ($p < 0.05$) in CI than in PL. BM gain was associated with water retention in CI (r = 0.899; $p = 0.002$) but not in PL (r = 0.335; $p = 0.417$). Pre-Ex blood pH, blood HCO_3^- concentration and base excess increased ($p < 0.05$) only in CI. Changes in UBISP, GNA and GPA did not differ in the two groups. In conclusion, ingestion of CIT increases blood buffering capacity and PV and stimulates BM regain during 16 h recovery from RBML in trained wrestlers. However, CIT does not improve UBISP nor does it have an impact on the affective state.

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A CASE STUDY OF THE TRAING OF NINE TIMES NEW YORK MARTHON WINNER GRETE WAITZ

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The **purpose** of this study was to present training data based on analyses of the training diaries of nine times New York Marathon winner, five times World Cross Country Champion and World Marathon Champion Grete Waitz (GW). Calculations on the training reported in GW′s training diaries were used to estimate: (a) average number of training sessions during different periods of the training year, (b) average training volume (km/week), (c) distribution of training at different intensities. The training in the season 1971 and 1972 was mainly 800m training. She ran an average of 6 sessions and 83 km per week. I 1973 and 1974 her training volume increased to 100 km per week. The highest average training volume during a year she had in 1975, running an average of 155 km/week. In the peroiod1976 to 1984 average number of km/week were between 120 and 125. In 1979, which was one of her best seasons, she competed in all months of the year. Average weekly training sessions were 9.5 and average training volume 122 km/week (variation between 75 and 145). She took part in 50 races of which she won 48, including the World Cross Country Championship and the New York Marathon. She ran 3000m in 8:31.75 which would have been the world′s best time in 2011. For 1500m she ran 4:00:6, a time which would have been the third fastest in the world in 2011. Of her total training volume in 1979, 52 % were continuous running at a pace of 4:00min per km. This training was mainly carried out as morning runs. 41 % were continuous running sessions at a pace between 3:45 to 3:30min per km which is close to marathon pace. 2 % were marathon or half marathon races or training at a speed between 3:20 and 3:30min per km. 1 %, 2% and 1,5 % were carried out at 10000m pace, 3000m/5000m pace and 800m/1500m pace, respectively. 0,5 % were sprint or strides. In addition she did strength training twice a week. With a best time of 2:24:54 for the marathon distance, GW is the second fastest Norwegian female marathon runner ever. The Norwegian record is hold by former world record holder Ingrid Kristiansen (IK) (2:21:06). The fact that IK compared to GW ran an average of 33 % more kilometers per week in her best seasons, can be a reason why IK ran faster than GW on the marathon distance, even though GW was a faster 1500m and 3000m runner. Stine Larsen (SL) and Kirsten M. Melkevik (KMM) are with their times: 2:27:05 and 2:29:12 number three and four on the Norwegian all time female marathon statistic. SL and KMM were running an average of 180 and 200 km/week in the seasons the ran their best marathon races (Enoksen, Tjelta et al. 2011), which is far more km/week than GW ran. GW however ran faster on the continuous runs than as well IK, SL and KMM did. The training of international male marathon runners is usually based on one of two basic models: A), workloads with an average of 200-260 km/week based on high training volume at low intensity; or model B) workloads with an average of 150-200 km/week with a greater proportion of the running at higher intensities (Ferreira and Rolim 2006). Both models have been shown to be beneficial for performance at a high international level. Even if GW did run most of her continuous running sessions at rather high intensity, her training volume is beneath the lower limit in model B. So despite the fact that she from the late 1970s to the middle of the 1980s was the best female marathon runner in the world, we may ask the question if she could have run even faster on the marathon distance if she had ran more kilometers per week?

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FROM "COUCH POTATO" TO HALF-MARATHON RUNNER IN 14 WEEKS

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Since the physical activity in both children and adults are decreasing in most countries, new ways of motivating people to be physically active is important.

The **aim** of this study was to design a training program for untrained adults and enable them to run a local half-marathon race (21100 m) after 14 weeks of training. Furthermore, in collaboration with a large regional newspaper we wanted to publish the story of three untrained adults following this training program to stimulate to more physical activity among the readers. The project was presented in the regional newspaper, and those who were interested in participating were requested to enlist. Criteria of inclusion were that participants had a job which to a small extent required physical activity, and they should not be regular physically active. A total of 169 adults, 60% women, 17- 74 years of age wanted to take part in the project. Two females (F1: 35 years and F2: 40 years) and one male (M1: 58 years), were included and followed closely during the project period. The training program consisted of two interval sessions (from 15 to 28 minutes effective running at a heart rate at 90 % of maximum) and two continuous sessions which started with 30 minutes walking and jogging in week one and ended with jogging the half marathon after 14 weeks. The participants carried out a VO_{2max} test and a 3000m running test at baseline and after 13 weeks.

VO_{2max} increased for all participants: F1 from 34.3 to 37.3 ml · kg^{-1}· min^{-1} (+ 9 %), F2 from 31.2 to 39.9 ml · kg^{-1}· min^{-1}(+ 24.7 %) and M1 from 32.4 to 43.6 ml · kg^{-1}· min^{-1} (+ 43.6 %). Running times for 3000 meters were reduced with 140 seconds (10.5 %), 120 seconds (12 %) and 197 seconds (16.9 %) for F1, F2 and M1 respectively. BMI was reduced for all three: 32.45 to 31.55 (F1), 24.68 to 21.77 (F2) and 28.39 to 25.69 (M1). A total of 48 project related articles were published in the newspaper′s paper version and on their web site. The paper version has a daily circulation of 65000, and the estimated numbers of readers are 180000. The number of competitors in the local half-marathon race increased from 450 in the year prior to this project, to 937 in the project year. All participants finished the half marathon race after 14 weeks of endurance training. Their times were 2:24:54 (F1), 2:20:18 (F2) and 2:15:30 (M1). For M1 the pace per kilometer in the half-marathon race was 6:25 minutes, which is only one second slower than the kilometer pace in the 3000 meter test at baseline. The training success for the three participants also seems to interest and motivate many of the readers. An inquiry among the readers of the newspaper that promoted the project showed that 6 of 10 subscribers read about the project. The newspaper′s website where all information about the project, the progression and status of the participants and the weekly training program where published was searched, in average, 25000 times of unique users every week during the project period. Six times the newspaper invited the readers to net-debates concerning training, physical activity nutrition and health. There was great interest among the newspaper readers regarding these debates. Three times the readers of the newspaper were invited to join an interval training session with the project participants and their coach. A total of 150 people met on these three training sessions. Due to the great interest of the project, another regional newspaper in Norway copied the idea and has started a similar intervention. To conclude: less cost-effective and tailored designed lifestyle intervention program with high impact can be scaled up and reach a large number of people by working together with a newspaper desk. Very few small scale interventions are being published and we have not found any studies which have evaluated how collaboration between a regional newspaper and scientists can lead to increased focus on aerobic fitness training. The results from this study could therefore be of interest for others who want to initiate similar projects.

OCCUPATIONAL DIFFICULTIES AT WORK OF PHYSICAL EDUCATION TEACHERS

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Depending on the research **aim**, methods theories and approaches applied (sociological or psychological), authors present difficulties of PET work rather differently. In psychological research "difficulty" usually refers to the reason of job stress or burnout. The problem issues of difficulties at work are also discussed in studies about job satisfaction and dissatisfaction. In those studies they are described as "sources of job dissatisfaction" and "the specific factors which are influential on the teachers' job dissatisfaction". In terms of sociology, there are studies referring to PET job difficulties as problems. In spite of this, all of them refer to one and the same irritant which causes tension, fatigue, poor feelings of well being, dissatisfaction, stress and burnout in PET work.

It should be noted that all those studies about PET work difficulties are individual. However, despite the large number of studies conducted, and the progress made in this area, a universally accepted survey or systemic model identifying five most important difficulties in PET work usually defined in contemporary studies still does not exist. This is mainly because there is still no consensus either on the decisive factors causing those difficulties for PE teachers or what the central symptoms actually are. Thus, the purpose of this study was (a) to review, (b) to systematize, and (c) to identify five most important difficulties in PET work usually defined in contemporary studies.

This review examines the research literature concerning causes of stress and burnout of physical education teathers from the year 1999 to 2009 applying computer-aided literature search. The keywords used for the electronics search were "stress" or "burnout" or "job satisfaction" and "physical education teacher". Various databases were accessed, including SPORTDiscus, Health Medline, ProQuest and PsycINFO. A grand total of 41 articles were sourced from a broad selection of journals. Conscious of the inadequacy of many of the articles' relevance to the literature review, the researcher re-examined the articles and applied a specifically designed five criteria model to increase the focus of the study: (a) they must be published in English, (b) they must be directly related to stress, burnout or job satisfaction with a focus on physical education teacher, (c) they must be an original study; (d) they must be published between 1999 to 2009, and (e) they must be published in journals, thus excluding books, unpublished papers, doctoral dissertations and master theses. Having sourced 41 articles originally, 15 proved suitable after implementing the selection criteria. Thus, the main method of our research was logical deductive research literature analysis.

Discussion (major findings and conclusions). Research literature review and identification of PET work difficulties (we found 24 of them) we suggest that they are as follows: low status of physical education (by the society, students, parents); limited equipment, facilities and supplies; lack of time; large class sizes; excessive daily workloads; no text books; no standard comprehensive curriculum; no standard/objective evaluation; most PE teachers were required to teach at least one other subject such as language, history, mathematics, etc.; PE teachers are also sometimes required to serve as guardians, disciplinarians, and role models; PE teachers feeling of monotony because they usually teach the same curriculum over and over again; excessive and unnecessary paperwork; the dual role conflict of teaching and coaching; additional work (as in going with school teams for several weekends) with no extra pay; the marginal status of PE teacher; problems with administration; salaries, bonuses and allowances; pupils' problems (poor physical ability, poor attitude and motivation, misbehavior); responsibilities for pupils' safety; student injuries etc.

We systematized the PET work difficulties and divided them into four categories: 1) subject-matter related (status, meaning, condition, PE curriculum), 2) PET personality (PET status, professional satisfaction, professional problems), 3) school community (administration, teachers, pupils, parents), and 4) work environment (conditions, teaching aids, work load, duties, salary).

We established that the five most important difficulties in PET work usually defined in contemporary studies were as follows: low status of physical education; limited equipment, facilities and supplies; lack of time; large class sizes and excessive daily workloads.

CREATING AN EFFECTIVE LEARNING ENVIRONMENT: ATITUDES OF PHYSICAL EDUCATION TEACHERS

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Physical Education (PE) teacher is the main organiser and implementor of the process of physical education and sport (formal and extracurricular) in school. It should be noted, that in research more focus is placed on the peculiarities of the PE lesson organisation, the analysis of the PE curriculum content, or childrens' needs, rather than on the professional stand of PE teacher with respect to revealing their attitudes towards PE lessons, although the questions on public's physical self-education were always a hot issue, in general. The aim of this study was to find out, what is the main stimulus and interference of the effectiveness of PE lessons in PE teachers' opinion.

In total, 56 PE teachers (31 males) from the city Šiauliai, Lithuania, took part in this study. On average, their age and teaching experience were 45.28±1.93 vs. 44.79±1.45 and 21.03±1.92 vs. 21.04±1.46 years for males vs. females, respectively. To detect the attitudes towards PE lessons, four question scales with five answers to choose from (from *strongly agree* to *strongly disagree*) for the given propositions were composed based on the Standards of Teacher Education (Pedagogo rengimo standarto gairių projekto tyrimo ataskaita, 2006). First question, in aiming to retrieve the information from PE teachers with regards to their attitudes towards PE lessons, was: "*What do you like in/about PE lessons?*" Another question was composed to find out what difficulties teachers are confronting in order to lead their lessons effectively. The third question scale was designed to evaluate teachers' opinion regarding their students' character features, which may facilitate the effectiveness of teachers' attempts in leading a PE class professionally. The fourth question scale reflected those character features of the students which, according to the teachers, were interfering with an effective process of a PE class. Statistical analyses were performed using SPSS for Windows 14.0. a statistical significance was set, when $p \leq 0.05$ with confidence level of 95 %.

To the question "*What do you like in/about PE lessons?*", the teachers had answered unanimously, that they like the great variety of the activities, the possibility to give to the students the benefit of their knowledge, experience positive emotions, to teach others, to be able to realize one's potential as well as to modify activities based on the needs of their students. With the help of a second question we aimed to detect teachers' opinion about the difficulties that teachers have and which inhibits the effectiveness of PE lessons. One of the greatest inhibitors to lead a PE class effectively in the teachers' minds is a meager teaching and learning environment. Third and fourth questions were associated with teachers' opinion about their students. Teachers were asked which students' attributes helps them to give a lesson professionally, and which characteristics are causing difficulties. The majority of PE teachers value many features of students' character (such as seeking knowledge, self-confidence, being initiative, etc.), that helps to lead a class effectively. When asked to mention, what characteristics of their students interfere with the effectiveness of their lesson process, female teachers refer to such character features of their students as fierceness, double-dealing, spitefulness, or avoidance of accountability. Male teachers indicate only one such feature – a weak health status of their students.

Discussion (major findings and conclusions). According to the teachers, meager teaching/learning environment, students' fierceness, double-dealing, spitefulness, avoidance of accountability, and weak status of children's health are those factors, which interfere with the effectiveness of PE lesson. Among the stimulus teachers indicate such factors as the great variety of the activities, the possibility to give to the students the benefit of their knowledge, experience positive emotions, to teach others, to be able to realize one's potential, to modify activities based on the needs of their students as well as student who seek knowledge, are self-confident and initiative.

TO WHAT EXTENT DO PHYSICAL EDUCATION LESSONS STIMULATE PUPILS' AEROBIC FITNESS PERFORMANCE?

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The Norwegian physical education curriculum underlines that physical activity for all during childhood and adolescence is important in promoting god health. Aerobic fitness performance is the most pronounced health status marker at any age (Ortega, Ruiz et al. 2008). This study has focused on how effective the physical education lessons in a Norwegian School are in stimulating the pupils′ aerobic fitness performance. The heart rate (HR) of 120 pupils (60 girls and 60 boys) in class 5 and 7 (12 and 14 years old respectively), were registered during physical education lessons containing different activities. These activities were ballgames, running, swimming and different indoor activities. The pupils′ HRs were measured by Polar Sport tester 600 (Polar Electro, Oy, Kempele, Finland). HRs were registered every fifth second. The pupils′ maximal heart rates (HR_{max}) were estimated to be 210 and appropriate HR for stimulating aerobic fitness performance was set to be >75 % of HR_{max} (>160 beats per min (bmp)). In addition to the hearth rate measurements, a log was written for every lesson. HR was compared with each pupil′s effort and the way the teacher administered and organized the lessons. In average 19 minutes of a 45 minute lesson, were used for changing clothes and showering. The remaining 26 minutes were used for activity. Of the total activity time 23.5 % of the time the girls had a heart rate < 160 bpm, 53.8 % of the time HR was between 160 and 190 bpm and 27.7 % of the time HR was >190 bpm. The percentage for boys was 63.4 % (<160 bpm), 34.2 % (160-190 bpm) and 0.6 % (>190 bpm) respectively. Great differences between the sexes were found for the swimming lessons were the girls spent 95 % and the boys 37 % at intensities > 160 bmp. For the other activities the differences between the sexes were small. Excluding swimming, the girls spent 40 % of the time at intensities > 160 bpm, boys 37 %. Each lesson and each activity show great variations between pupils regarding time spent at different HRs. In team activities like football and indoor bandy most pupils (80 %) had a HR > 160 bpm when they did individual technical training, but when it came to playing the game, the HR among pupils varied greatly. Average HR was below 160 bpm among the pupils who the teacher classified as the less technical and less good ball players. It seems like girls more than boys prefer long distance swimming as an activity, and that this is the reason why they push themselves more in this activity than boys do. If the break between lessons could be used for changing clothes and showering, more time could be spent on activity. From an observer′s point of view there were great variations in how effective the teachers were in organizing the physical activity lessons. Time used for organizing and talking differed between 2 and 12 minutes. If it is an aim that the physical activity lessons shall have a training effect, it is of importance that teachers spend less time organizing and talking. It is also an idea to ask the pupils who to a lesser degree are included in the team games what kind of activities they prefer, and arrange for such activities. These pupils are usually the pupils who are less active in their leisure time.

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PHYSICAL LOAD INTENSITY IN STANDARD AND LATIN AMERICAN SPORTS DANCING CONTEST PROGRAMMES FOR JUVENILE DANCERS

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A sport dancing is becoming more and more popular among children and adolescents. Even children start participating in sports dancing contests. Sports dances at the contest intensity demand great athletic fitness and functional capacity from dancers (Faina, Bria, 2000; Kostić et al., 2003; Климова, 2009; Klonova, Klonovs, 2010; Радионов, 2011). We still lack research about the peculiarities of the dancers' of various age body adaptations to physical loads while dancing. **Research aim** was to investigate changes in the heart rate and energy consumption in the group of juvenile dancers while dancing Standard and Latin American dances.

The research participants were 16 dancers (8 girls and 8 boys). The age of girls was 9.88 (0.83) years, and that of boys – 9.86 (1.07) years. We established changes in the heart rate dancing Standard and Latin American dances. During continuous dancing we registered the heart rate using "Polar S 610" Heart Rate Monitor (Finland) with computer data registering system. According to the indices received from the heart rate monitor we calculated the average, maximal and minimal heart rate values and energy consumption (kcal) during the period of sports dancing programme. These theses present arithmetic averages ($\bar{x}$) and standard deviations (SD) of the research data.

We established that during the model training session, dancing four Standard dances, 2 min each, imitating the contest with short rest intervals, the heart rate (HR) increases to 189.5(12.90) beats/min for girls in the juvenile group and to 186/75(18.45) beats/min for boys in the same group. The girls' average ($\bar{x}$) HR during a 10-min model dancing contest amounts to 165.45(12.00) Beats/min, and that of boys – 162.34(13.22) beats/min. We established that performing the Latin American dancing programme, HR for juvenile girls increases to 188.00(16.40) beats/min and to 188.40(17.11) beats/min for boys. The average HR for girls during the 10-min dancing practice amounts to 162.6(16.56) beats/min, for boys it is 160.63(17.44) beats/min. During the contest dancing programme HR alters – during the intervals between dances it decreases, and when another dance starts, it increases. During the contests the dancers perform physical loads of changing intensities.

Research results suggest that dancing sports dances under the contest conditions physical load exceeds the limits of anaerobic threshold and makes a great physiological impact on the cardiovascular system of young dancers.

While dancing both Standard and Latin American dances juvenile dancers carry out mixed aerobic-anaerobic physical load, and at some moments – anaerobic-glycolic physical load.

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THE IMMEDIATE EFFECT OF TRIGENICS MYONEURAL MEDICINE MANIPULATION ON LOWER EXTREMITY MUSCLES TONE IN MALE BASKETBALL PLAYERS

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Muscle tone has mainly been viewed as a manifestation of *stretch reflex* neuromotor control (Simons et al, 1998) and a few researches have been done on a problem of *resting* muscle tone. The aim of this study is to estimate the immediate effect of interactive and integrated Trigenics Myoneural Medicine manipulation (TMM) on muscle tone and viscous-elastic properties (elasticity and stiffness) in highly qualified basketball players.

Eleven male basketball players of an Estonian elite league team) participated in the study. Athletes were distributed into two groups: athletes with worse (group I) and better ankle conditions (group II) by FAOS Pain subscale. TMM was applied to facilitate neurological pathways involved with muscle relaxation and pain reduction once per two months during the regular season period (total of five times). TMM is combined with Eastern manual medicine and modern neurophysiology and based upon a neurological rather than mechanical model of treatment. The muscle tone, elasticity and stiffness characteristics of tibialis anterior muscle (TA) and gastrocnemius muscle medial head (GM) were investigated using myometer Myoton-3 at rest. Foot and ankle outcome score (FAOS) questionnaire was used to assess the influence of TMM. Pain and Symptoms subscales were taken into consideration. Spearman correlation analysis was performed to estimate relationship between FAOS and muscle tone and viscous-elastic properties.

Significant decrease ($p<0.05$) of tone of TA muscle and increase of GM muscle tone after TMM were found. There were no significant changes found in elasticity of both muscles. Stiffness was significantly decreased in TA muscle after third TMM. According to FAOS questionnaire after TMM more significant decrease were noted in athletes of group with worse ankle condition. Relative changes were significantly different in muscle tone after TMM of both examined muscles compared to before TMM. Correlation analysis showed significant correlations between relative changes in tone ($p<0.05$) and FAOS test Pain subscale, between age and elasticity ($p<0.05$).

The first data of present study were collected at the end of preseason period; hence it demonstrated slightly higher tone of the muscles. It might indicate the insufficient muscle care during the preparation period or inadequate recovery period between trainings. However, it might also derive from the inadequate posture and functional efficiency during the period. Several studies have shown a relation between muscle tightness and injury likewise muscle strength and imbalance, articular ROM, postural stability etc. have been shown previously (Murphy *et al*, 2003). Preventive training and a structured programme of warm-up exercises should be designed in order to prevent knee and ankle injuries in young people practicing sports (Olsen *et al*, 2005). As a result, a warm-up and stretching protocol should be implemented prior to physical activity. The routine should allow the stretching protocol to occur within the 15 minutes immediately prior to the activity in order to receive the most benefit (Woods *et al*, 2007).

In conclusion, results of the study demonstrated changes of tone of TA and GM muscles immediately after TMM manipulation in male basketball players. Using of TMM gives potential implications for competitive athletes as it improves condition of skeletal muscles.

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SELECTED PARAMETERS OF POSTURAL STABILITY AND BODY COMPOSITION IN ELITE FEMALE SOCCER PLAYERS

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Posture stability and symmetry of muscular apparatus are very important and discussed parameters in sport (Paterno et al., 2004; Paillard & Noé, 2006). Bilateral difference in balance may be a contributing factor to injury and low balance ability is associated with an increase risk of ligament injuries (Gstöttner et al., 2009). Detection of asymmetry in balance and distribution of muscle mass is important to prevent injuries by modifying training process. The aim of this study was evaluation of bilateral symmetry in posture stability and body composition of lower limbs in elite female soccer players.

Research sample consisted of Czech representation in female soccer (n = 20; aged 23.3 ± 4.3 years; height 167.2 ± 6.4 cm; weight 60.9 ± 5.3 kg). Postural stability was measured by pressure measurement system FootScan (RScan, Belgium). Evaluation was based on movement of Centre of pressure (COP) and evaluated parameters were front-back deviation (Yavg), right-left deviation (Xavg) and total travel way (TTWavg). To evaluate posture stability one lower limb stand test (Flamingo) was used. Time of stand in test was 60s for each lower limb. Segmental distributions of body fluids in lower limbs were measured by multifrequency bioelectrical impedance analyzer InBody 3.0. Evaluated parameters were amount and distribution of fluids in lower limbs.

Values of right-left deviation in stance on right lower limb were Xavg = 18.6 ± 6.6 mm and in stance on left lower limb were Xavg = 17.8 ± 3.3 mm. Values of front-back deviation in stance on right lower limb were Yavg = 32.5 ± 14.2 mm and in stance on left lower limb were Yavg = 30.2 ± 7.7 mm. Values of total travel way (TTWavg) parameter in stance on right lower limb were TTWavg = 831.9 ± 319.8 mm and in stance on left lower limb were TTWavg = 888.9 ± 451.3 mm. Average value of fluid distribution symmetry between right and left lower limb were 0.0655 ± 0.0049 liter. Symmetry of fluids distribution in lower limbs was evaluated with level of significance 0.1 liter. One player has reach this level and three other players in sample were over fluid distribution limit with maximum asymmetry of 0.17 liter. Asymmetry of fluid distribution between right and left lower limb was found in four players.

Most appropriate parameter for evaluation of posture stability in stance on one lower limb was total travel way of Centre of Pressure (TTW). One of players, which reach best result in stance on right lower limb (TTW = 471 mm) has also reach value on left lower limb of 149% higher (1178 mm). On the other side one of players reach worst results in TTW parameter in right and left lower limbs (2580 mm resp. 1720 mm). In fluid distribution parameter only 20% of players were evaluated as asymmetric with difference between lower limbs over 0.01 liter. Symmetric level in fluid distribution between lower limbs of 0.06 liter reaches 12 players, which means 60% of research sample. Based on measured values was research sample homogenous in both postural stability and fluid distribution between lower limbs. Asymmetry in segmental distribution of muscle mass could decrease performance in sport and increase risk of ligament injury (Gstöttner et al., 2009). One of the main requirements for soccer players is ability to perform specific movement activities in appropriate manner by both lower limbs.

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MENSTRUAL CYCLE PHASE AND ORAL CONTRACEPTIVE USE IN RECREATIONALLY ACTIVE ROWERS: NO EFFECT ON INCREMENTAL TEST RESULTS

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Introduction: Oestrogen and progesterone fluctate predictably across the menstrual cycle (MC) in normally cycling eumenorrhoeic women (Oosthuyse & Bosch, 2010). The oral contraceptive (OC) use may provide a more stable environment to evaluate the effect of reproductive hormones on physiological variables and exercise performance in women (Rechichi et al., 2009). Maximal oxygen consumption (VO_2max) is an important determinant of rowing performance over 2000 metre distance (Jürimäe et al., 2008). The aim of this study was to examine whether variables commonly used in aerobic exercise testing in rowing are influenced by MC phase and OC use in female athletes.

Methods: Sixteen recreationally trained female rowers participated in this study and were divided into two groups: normally cyclic athletes (NCA; n=7) and athletes taking oral contraceptive pills (ROC; n=9). Rowers performed two incremental tests on a rowing ergometer during two different phases of the MC: the follicular phase (FP) and the luteal phase (LP). The study variables were power output (Pa), heart rate (HR), oxygen consumption (VO_2), carbon dioxide production (VCO_2), minute ventilation (V_E), the mean respiratory exchange ratio (RER), and ventilatory equivalents of O_2 (V_E/VO_2) and CO_2 (V_E/VCO_2), which were measured during the incremental test. In addition, peak blood lactate (La) values after the test were obtained.

Results: When comparing Pa, VO_2, HR, V_E, RER and La values, no significant differences ($p>0.05$) between FP and LP at maximal load were found in two groups of studied rowers.

Discussion: The present observations of no menstrual cycle differences in peak La concentration and other measured physiological variables are similar to what has also been found in other studies (De Souza et al., 1990; Forsyth & Reilly 2005). In conclusion, sport-specific endurance performance was not influenced by the phase of the normal menstrual cycle and the synthetic menstrual cycle of the OC users in studied rowers. Therefore, normally menstruating recreationally trained rowers and recreationally trained rowers taking OC pills should not be concerned about the timing of their MC with regard to optimized sport-specific endurance performance.

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DOES THE SPORT STUDY FIELD BELONG TO THE LIFE SCIENCES IN THE LITHUANIAN HIGHER EDUCATION?

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Introduction. University teaching and learning take place within ever more problem-oriented disciplinary settings, each characterized by its unique traditions, concepts, practices and procedures (Krishnan, 2009). University is supposed to deal mainly with providing services to all sectors of society, being useful and responding to the demands and pressures of global market forces and to deal with narrow specialization (Samalavičius, 2010). The following problem questions: 1) How sport study field manifests in the in the discipline-based higher education? 2) How sport study field is related with life sciences? Based on the problem questions we defined the objective of the study: to present how sport study field manifests in the reality of higher education and to reveal its relationships with the life sciences.

Methods. An exploratory approach was used to analyze the manifestation of sport study field in the discipline-based higher education by enclosing concepts in the hierarchy of disciplines in different profiles.

Results. The description of the study fields in Lithuania is getting closer to the standards of the Higher Education Statistics Agency (HESA) and Universities and Colleges Admissions Service (UCAS) and to the coding system in the United Kingdom (UK) Academic Classification of Subjects (JACS). The approved Lithuanian list of branches of study field (2009) showed that „sport and exercise C600“ is divided into: sport coaching, health and fitness, sport conditioning and rehabilitation, sport studies, sport and exercise biomechanics, motor control and learning, sport and exercise psychology. While UK “JACS” coding system is constantly refreshing and points differences even in the study field name: „sport(s) and exercise science C600“. The reality of the practice raises complex problems which are often associated not only with traditional disciplines, but also with interdisciplinary or transdisciplinary nature where collaboration between researches is necessary. The hierarchy of disciplines in sciences (natural, health, social, engineering, humanities) according to “sport education” and “movement education” concepts showed that the content of sport study field should be relevant to students in terms of shaping their holistic personalities and in terms of improving their chances of being successful in life and to become a professional. We characterized the “core sciences” (natural, health, social) which disciplines that belong to the same knowledge subsystems are closer together. While the “extensible sciences” (humanities and engineering) which disciplines belong to the different subsystems and are far off from each other. Life science generally seeks to answer the what, where, how and why of all living things, but health science focuses on the discovery, treatment and preservation of animals and human beings.

Discussion. The absence of a universally accepted model of the structure of knowledge for our field develops different cognitions of the same phenomenon. The implication is that at one way in the sport we are seeking for a better move, quicker reaction, on the other way – health strengthening or rehabilitation is emphasized, and thirdly – manifestations in favor of human movement as the subject of study of our field. When the main point is made on the ‘move’ and its technique improvement, then the new fundamental knowledge is created. But when the meaning of the ‘move’ is under consideration for the dynamic social systems we are not able to generate sustainable prognostication theories. The progress of the integration of different sciences such as medicine, health, life and social is obvious. The main point of such integration becomes knowledge production and application it to the society‘s needs. Knowledge production can be viewed not only as a social process, but also as a process that is not independent of an external reality to which any knowledge needs to refer to disciplinary boundaries, which sometimes prevents academics seeing the close connections of different phenomena and also of the different disciplines (Krishnan, 2009).

Conclusions. In pursuance of undergraduates qualification‘s and global market‘s discrepancy we have to expand the opportunities of employment, but not to de-escalate programs of the sport study field. Students who choose to study the sport field cannot confine only to the life sciences approaches. Such approaches in the sport study field are not compatible with the legislations in Lithuania. For the coaches and trainers only Master's degrees and qualification courses confer the right to teach in gymnasiums and colleges and to work in sport‘s theory and practice. The changes in society and the process of teaching show that universities and academies must take into account these facts while training would-be teachers.

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PHYSIOLOGICAL CORRELATES OF CYCLING PERFORMANCE IN AMATEUR MOUNTAIN BIKERS

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Mountain biking (off – road cycling) is becoming an increasingly popular in Lithuania. The most popular mountain biking event is cross country (XC) and marathon, often referred to as cross country marathon (XCM). Both events are a mass - start endurance competition. Mountain biking is a physically demanding sport. The duration of these events suggest that high aerobic power and the ability to sustain high intensity exercises for prolonged period is required and the fast starting phase, fighting against gravity during the steep climbs (up to 500 W) suggest that anaerobic metabolism plays a significant role (Impellizeri et.al, 2002). VO_{2max} is considered to be a standard indicator of the integrated function of cardiovascular, respiratory and muscular systems during exercise and an important determinant of aerobic endurance performance (Bassett, Howley, 2000). High – level mountain bikers aerobic fitness explains about 40% of the variance in performance, this suggests that other factors as anaerobic power and capacity, technical abilities need to be considered in the physiological assessment of these athletes (Impellizzeri et. al, 2005). During mountain biking competitions, the different terrain conditions require that mountain bikers have a high degree of technical ability to control and stabilize the bicycle. Riders might increase their speed downhill and can gain advantage or decrease the time lost in other parts of the course (Wang, Hull, 1997).

The **aim** of this study was to investigate the physiological correlates of cycling performance in amateur mountain bikers.

15 Lithuanian mountain bikers who participated in mountain biking marathon were tested. Anthropometric measurements were performed. The 10 - second test was performed to estimate the special alactic anaerobic power output, whereas the 30 – second Wingate test was performed to estimate composite alactic anaerobic glycolytic power output. For evaluating the aerobic capacity progressive incremental laboratory cycling test to exhaustion was performed. During this test pulmonary ventilation (VE), heart rate (HR), oxygen usage (VO_2) and power output (W) was continuously registered, also anaerobic threshold was determined. We used a Pearson's correlation coefficient to calculate the correlation between cycling performance and physiological capacities.

We found a significant negative correlation between cycling performance and alactic anaerobic relative peak power output ($r = - 0.534$, $p < 0.05$) and lactate concentration after progressive incremental cycling test to exhaustion($r = - 0.625$, $p < 0.05$). However, we did not find significant correlation between cycling performance and VO_{2max} ($r = -0.21$, $p > 0.05$) and composite alactic anaerobic glycolytic power output ($r = - 0.269$, $p > 0.05$). Whereas composite alactic anaerobic glycolytic power output has significant positive correlation with lactate concentration ($r = 0.538$, $p < 0.05$). Our findings suggest that

alactic anaerobic power output and active glycolysis play a very important role in off – road cycling performance. This is essential because of fast starting phase of the race and steep climbs. This group of amateur mountain bikers should be characterized by heterogeneous performance level, this explains why we didn't find the significant correlation between aerobic fitness and cycling performance (the range of cycling performance was 6903.35 – 9004.30 s and the range of VO_{2max} was 48.2 – 73.6 ml/min/kg). Our further studies should investigate the influence of technical ability and physiological parameters to cycling performance of homogeneous mountain bikers group.

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SHOOTING DIVERSITY IN YOUTH FEMALE BASKETBALL PLAYERS OF LITHUANIAN CENTRE ACCORDING RANK OF COMPETITION LEVEL

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Introduction. The number of points scored characterize basketball teams ofensive character, game performance, which depends on objective factors such as the opponents playing style, capable team number of players, team tactics in competitions (Sampaio and Janeira, 2003). Shooting efficacy and matches results dependence of the shooting position according age and mastership of players require more researches (Sampaio et al., 2004). *The aim* of the research was to carry out interaction of shooting and match results of Lithuanian female youth national team players dependent on the competition level.

Methods. Players were divided into guard (n=1), forwards (n=4) and centers (n=2). We analysed statistics of selected 6 key indicators**:** 2 and 3 point field goal attempts, free-throws. The data were processed by SPSS 17.0 for windows program. Person's correlation coefficients were calculated to determine the relationships between match result within all shooting types and different players.

Results. The top efficacy of shooting were found in Lithuanian Championship (LC), the lowest in European Championship (EC). The highest efficiency of free-throws shooting were found at II period (62,53 %), two-points shooting efficacy at I period (44,74 %), three-points efficacy at I period (19,45 %) in LC. A significant differences ($p < 0.05$) between free-throws and three-points shooting efficacy were found at I period, between free-throws at II period in LC, and between two-points and three-points in EC compared to players from all different positions. Two-point field goals were the major percentage in points structure independently of competition level (I period – 60,91%, II period – 60,78%, EC – 54,19%). Free-throws composed least part in points structure. The most part of three-point field goals (24.45%) compound in EC than in LC both periods. Seven players of LBC in Lithuanian Championship (I and II period) made the major part of all points i.e. 74% in I period and 75% in II period. However, contribution of LBC players in international competition level EC was not significant compared to national: mentioned 7 players scored 59% of total team points.

Discussion. The fact that points scored per match-play decreased in the end of season more than 30 points might be considered as the factor of mastership the Lithuanian youth team at the EC, or limitation of players' fitness (Trninić et al., 2002). The fact that players performed successful efficiency in both stages of LC and had won all matches with great different of points, but remarkable decrease in of shooting efficacy and winning one match-play only (total played 9 matches-play) in EC, might be considered as not enough level of mastership by opponents teams in LC or not enough individual level of sport performance. Lithuanian basketball federation should rethink the system of targeting training Lithuanian youth team in order to manage suitable competition level for better advance performance in future.

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PSYCHOLOGICAL PREPARATION FOR HIGH LEVEL COMPETITIONS

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The **aim** of the research is the evaluation of the impact of psychological preparation component content implementation on results in high level competitions. Psychological preparation is an important factor in high level competitions. Several common directions are realised in the process of psychological preparation both in individual and team sports: the development of attention qualities; the ability to work effectively even in situations of high fatigue, also when there are unforeseen obstacles; the favouring of the feeling of satisfaction with progress dynamics, the favouring of the skills of analysing and reflecting (Vazne, 2009). Thus, when preparing for important competitions not only a participant's knowledge and skills, but also the development of definite psychic condition should be facilitated with the help of various technologies (Moran, 2004, Murphy, 2005).

The research was held three months before the participation of the Latvia National Team (n=6) in the European Championship 2010 in the individual and pair test (EuroSkills 2010, Portugal) and three months in 2011 before the participation of the Latvia National Team (n=2) in the World Championship in the individual test (WorldSkills 2010, London).

A partly structured interview (with the aim to find out the participants' basic needs in psychological field), testing (with the aim to state the participants' ability to understand their emotions (ES), the skill to regulate it according to conditions (SR), achievement motivation (MK) and attention stability) were used in the research, pedagogically-psychological experiment (with the aim to state the changes of the psychological preparation component indicators before and after the implementation of the worked-out content) was carried out, as well as the analysis of the results gotten in the competitions, and mathematical statistics were applied. Psychological classes were held three months before competitions once a week for one hour each time.

The work with the participants was based on the behaviourally-cognitive approach. Various methods: discourse, discussion, visualisation, relaxation, learning of breathing techniques to eliminate stress effect were applied to implement the content.

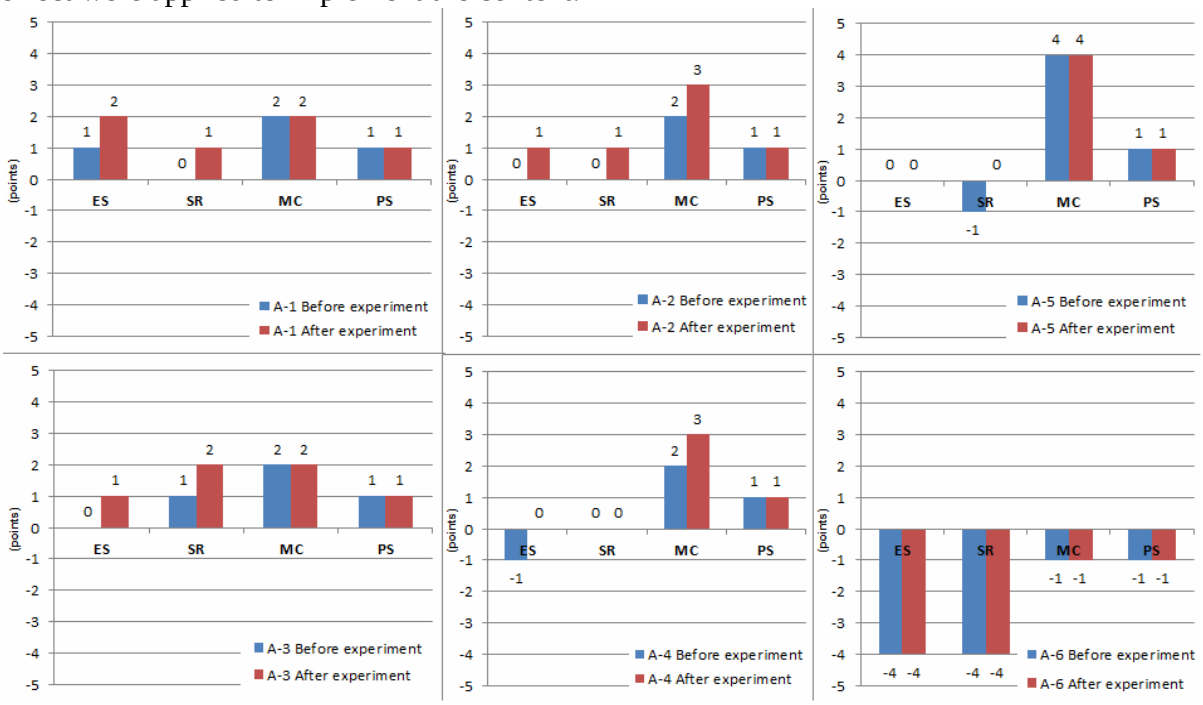

Fig.1. Indicators of psychological preparation before and after the pedagogically-psychological experiment in the individual and pair competitions (EuroSkills 2010)

The analysis of the Fig. 1 shows that in the experimental group (before and after the experiment) 5 participants had differences in three of four scales characterizing participants' psychological preparation.

The changes in the indicators are statistically significant ($p<0.05$). For one participant (A-6) the changes are not statistically significant ($p>0.05$).

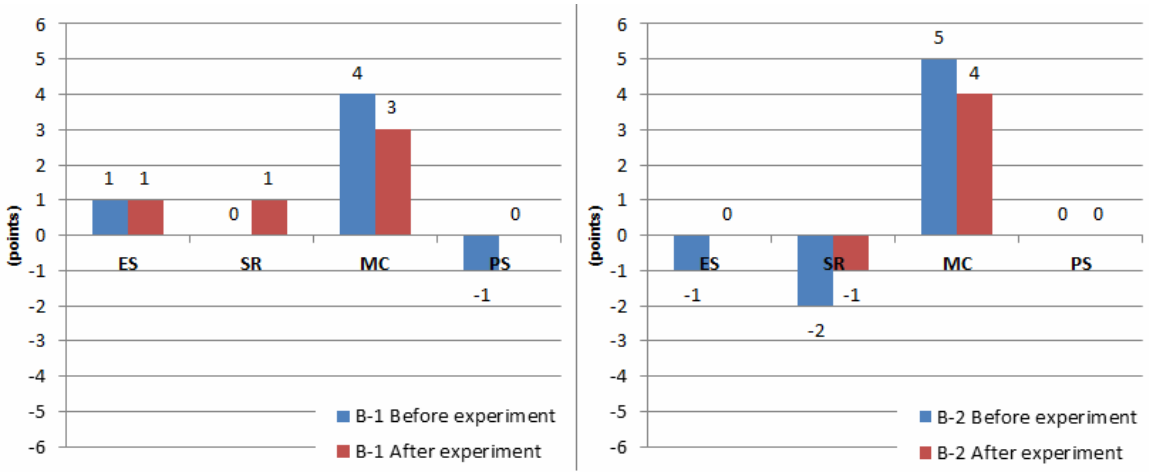

Fig. 2. Indicators of psychological preparation before and after the pedagogically-psychological experiment in the individual test (WorldSkills 2011)

The analysis of the Fig. 2 shows that before and after the experiment there were statistically significant changes in two of four scales characterizing participants' psychological preparation ($p<0.05$).

Analysing the indicators obtained in the research it is stated that the implementation of the psychological preparation component content promotes achievement in high level competitions. The approbated content of psychological components is scientifically substantiated and it can be used sports science (Vazne, 2008, Vazne, Malinauskas, 2011). The results are similar to the ones of the world research about interconnection of psychological preparation with competition results (Morran, 2004). The research not only shows the necessity of psychological preparation, but also gives insight into the development perspective of further research.

The results of the research allow concluding that the optimisation of the psychological preparation components facilitates results in high level competitions both in the individual and pair tests. In the European Championship (EuroSkills 2010) the participants of the Latvia National Team (n=6) got 1 gold, 1 silver (in pair test) medals and 3 excellence prizes. In the World Championship (WorldSkills 2011) the participants of the Latvia National Team (n=2) were short of 30 and 50 points (in 500 point system) to excellence prizes.

Key words: psychological preparation, high level competitions.

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UNIVERSITY STUDENTS` COMPLEX ESTIMATION OF A PHYSICAL CONDITION

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Studies on different aspects of physical health and lifestyle of young generation have been carried out in all developed countries, for example, the USA - Lisa Gaye Johnson (2006), Dr. Terence Hicks, Eboni Miller (2006), Russia - Баевский М.Р., Иванов Г.Г., Рыбыкина Г.В. (1999), Сорокина В.М., Сорокин Д.Ю. (2009), Чуян Е.Н., Бирюкова Е.А., Раваева М.Ю. (2008), Судиловская Н.Н.(2005) and others. Particular interest has been provoked by Russian researchers about the use of new technologies for estimation of functional condition of young people. The new equipment is mobile, convenient to use and it gives many-sided information on functional condition of a person; already prepared conclusions have been pre-programmed into the equipment that inform about the current functional condition of a human body. Thus, there is a possibility to inform young people about ongoing physiological processes in their bodies and encourage turning greater attention towards the health promoting measures. The **goal of the research** is to estimate current functional condition of a body to the students of Liepaja University and Medical College - Liepaja branch of Riga Stradins University. **Materials and methods**. The equipment "Omega - M" (Saint-Petersburg, "Dinamics") is a complex scientific equipment (eligibility certificate of Russian Federation Nr. POCC RU.ME01.BO5487), which analyses and interprets the electro signals of heart rate. In the base of the method for analysis of biorhytmical processes, new information technologies as well as the topical findings in biology, physiology, genetics and clinical medicine have been used. Any changes in a body are being reflected in the heart rate. Responding to the impulses of central nervous system, heart activity determines the rhythm of a whole body. Therefore, grounding on the heart rate dynamics, it is possible to estimate objectively the functional condition of a body and prognosticate further possible changes. Our research involves 182 full time and 19 part time students from LiepU and RSU Medical College of Liepaja branch, who were separated in three groups: first group – full time students; second group – part time students; third group – the students, who wish to link their further life with sports and dance. The screening – diagnostics of students` heart activity was made by the equipment "Omega - M", for all participants their heart rate was estimated in calm state; during 3 – 5 minutes time there were 300 cardio complexes registered. **Results.** SPSS data processing. using the Mann Whitney/U-test. found significant diferences in the integral health parameter (H) x_1 and x_2 groups ($U=617$; $p<0.001$), and groups of x_3 ($U=200$; $p<0.001$). Significant diferences between groups x_1 and x_3 are found in only one parameter (central regulation of cardiac rhythm (C) ($U=2736$; $p<0.05$).

Conclusion. Generally. the group x_1 and x_3 figures correspond to the integrated health indicator parameters (H). The group x_1 health parameter (H) integral is slightly lower than the norm.

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MOUSE MODEL IN UNVEILING THE GENETIC FACTORS OF EXERCISE PERFORMANCE AND HEALTH-RELATED FITNESS

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Inherited factors are important for exercise performance and health-related fitness phenotypes, and usually influence approximately 50 percent of the trait variation (Arden, Spector, 1997). For understanding of the mechanisms underlying inter-individual differences in performance and adaptation to training it is important to identify specific genes determining these traits, and increasing body of evidence from exercise genomics is shedding light on these mechanisms (Roth et al., 2012). Genome Wide Association Studies (GWAS) identify genes affecting common diseases (Ruchat et al., 2009) and traits such as height in humans (Perola, 2011). However, these studies require thousands of subjects and very large funding. In addition, the outcome in human studies seldom results in identification of specific genes, thus alternative models are required to help reveal the underlying genetic factors with a better efficiency.

Over the number of years the laboratory mouse model has evolved substantially, being currently one of the most exploited animal models and the best available mammalian model for revealing the genetic factors underlying common non-infectious diseases as well as physical fitness relevant to humans. The intense use of the model has rendered mouse anatomy, physiology (e.g. http://phenome.jax.org) and genomics (e.g. www.ensembl.org/Mus_musculus) extensively investigated, giving it a clear advantage over other models for understanding the human genetics. Strains of contrasting phenotypes, available genomic information and controlled environment make laboratory mouse an attractive model for studying the genetic factors relevant to various human conditions, including those of exercise performance and health-related fitness. The breadth of resources encompass a wide variety of mouse models (e.g. http://jaxmice.jax.org), mimicking the diversity of human genetic variety and conditions.

The implementation of the mouse model at Lithuanian Academy of Physical Education proved successful and has already resulted in publications. We have established that musculoskeletal traits and exercise capacity in mice vary depending on the genetic background. For example, males from inbred mouse strains (A/J, BALB/cByJ, C3H/HeJ, C57BL/6J, DBA/2J, and PWD/PhJ) differed in swimming endurance, cardiac and limb muscle weights, femur length and skeletal muscle histology and enzyme activity. Adaptability to endurance training was also strain-specific, e.g. increase in endurance and skeletal muscle citrate synthase activity was the largest in C57BL/6J and DBA/2J strains, whereas A/J and BALB/cByJ were non-responders (Kilikevičius et al., 2012). Thus the genetic background is a potent determinant of the physiological characteristics and adaptations to training in mice. In addition, among the six inbred strains studied we have observed that A/J mice have a 50-65% reduction in citrate synthase (CS) enzyme activity despite similar levels of Cs mRNA and CS and cytochrome C protein content

(Ratkevičius et al., 2010). *In silico* analysis of the genomic sequence identified a missense single nucleotide polymorphism (SNP) (rs29358506, H55N) in *Cs* gene occurring near the site of the protein interacting with acetyl CoA. Allelic variants of the polymorphism segregated with the catalytic properties of CS enzyme among the strains. Thus H55N polymorphism in Cs seems to be the underlying cause of low CS activity. It is emerging that this phenomenon might play a role in resistance to obesity of the A/J mice (Kus et al. 2008).

We continue the research of the genetic factors of exercise performance and health-related fitness, and have recently been awarded a grant from a Research Council of Lithuania to study mice derived by long-term selection for highly contrasting growth. These efforts will help to identify genetic loci influencing the cardiovascular, behaviour and other phenotypes, as well as identify specific genes underlying skeletal muscle traits. The logical sequence of this research will be the acquired possibility to manipulate genetic information and thus an individual's whole body phenotype.

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ALTERATIONS OF INTERACTIONS BETWEEN PERIPHERAL BLOOD FLOW AND CARDIAC FUNCTIONAL PARAMETERS DURING BREATH–HOLDING EXERCISES

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Introduction. Breathing is a reflex and voluntary act at the same time, therefore, deliberately shifting the intensity of respiration and its arrests, can significantly affect the body's vegetative functions. The efficiency of physical exercise increases significantly, when along with workload has been applied breathing exercises. Lack of data on interactions between peripheral blood and heart dynamics during breathing exercises was noted. The aim of this work - to determine alterations of interactions between peripheral blood flow and cardiac functional parameters during breath-holding exercises.

Methods. The research work included 18 volunteer students, all of them were untrained. All research conducted by two respiratory arrests untill full fatigue state with a five-minute break in between. Synchronically was registered standard 12-lead electrocardiogram (ECG). There were analyzed the changes of heart rate (HR), JT interval duration, the dynamical differences of JT and RR intervals and the changes of ST-segment depression. It was also measured arterial blood pressure (ABP). InSpectra Standard System Model 325 (Hutchinson Technology, USA) is a noninvasive monitoring system that measures an approximated value of percent hemoglobin oxygen saturation in tissue (StO_2). The InSpectra sensor was placed on calf below plethysmograph sensor on the gastrocnemius medial head. The blood flow in the calf was determined by venous occlusion plethysmography. During investigation was registered respiratory arrest durations. All cardiovascular functional parameters were recorded before testing, during breath-holding time and during the first two minutes of recovery after breath-holding.

The evaluation of interaction between physiological dynamic systems, accomplished by calculating numerical characteristics of the second-order matrix and most relevant information received from the examination of the matrix discriminant. If the discriminant value is close to zero, the interaction between the system parameters is high and the informativeness of an individual time series decreases.

Results. During the first testing after deep inheal an average breath-holding duration was 47.1 ± 2.3 sec., and during the second repetition - 48.5 ± 2.5 sec. Research subjects were able to continue respiratory arrest up to 75 sec. In both repetitions at the beginning HR increased ($p<0.05$) compared to initial values. Subsequently, HR declined during breath-holding. Relevant changes of HR interactions with periphery revealed only HR and diastolic ABP interrelation. Contrary to JT interval, JT/RR intervals ratio during the first 15 sec. increased ($p<0.05$) in both respiratory arrests, similarly systolic and diastolic ABP significantly increased ($p<0.05$). Similarly altered the interactions of these parameters. ECG ST-segment depression did not change significantly, although interaction of ST-segment and JT interval significantly differed comparing both trials. StO_2 in calf muscles decreased in the first and the second breath-holdings during the first 30 sec. ($p>0.05$). Calf muscles blood flow decreased ($p<0.05$) during the first and the second respiratory arrests and dynamical changes of interaction between calf muscles blood flow and diastolic ABP confirmed it.

Discussion. The heart might be affected reflexively by various organs and especially of their interoreceptors. As it is known, the aortic arch is rich in presoreceptors, of which *n. depressor* goes to the center. Presoreceptors affect the changes of HR - the higher is ABP of the aorta, more strongly irritated aortic presoreceptors are. Impulses of *n. depressor* influence *n. vagi* center in an excitant manner, whereas sympathetic heart center – in an inhibitory manner.

Respiratory arrests caused a very sharp fluctuations of the cardiovascular functional parameters and its interactions. Breath-holding caused less frequent HR, due to peripheral vasoconstriction increased systolic and diastolic ABP values, decreased the intensity of the arterial blood flow in the calf muscles. Therefore, the increased pressure gradient between the abdominal and thoracic veins increases venous blood flow and valves prevent its return back to the veins of the legs.

THE RELATIONSHIPS OF PUBERTAL DEVELOPMENT AND SOCCER TRAINING TO PHYSICAL PERFORMANCE IN 10-11 YEAR YOUNG BOYS

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Early maturing children have advantages over late maturing children in physiological and anthropometric characteristics (eg. strength, height, body mass) (Vegers et al. 2012). Several studies have reported that increased selection opportunities in soccer tend to favour older and physically taller boys (Philippaerts et.al., 2006). Even on some physiological parameters scaled for body dimension, namely relative strength and relative maximal oxygen uptake (ml/min/kg), early maturers score better (Vegers et al. 1012). Cross- sectional data are reasonably consistent in showing that early maturing boys tend to be more successful in soccer in mid- and late adolescence (Philippaerts et.al., 2006).

The **purpose** of the present study was to examine the effect of soccer training to physical performance.

In total, 110 schoolboys aged between 10-12 years were divided into soccer (no=55) and the control (no.=55) groups. The subjects were matched by age and body mass index (BMI), generating 24 matched pairs in group I (late maturing), 23 pairs in group II (on time maturing) and 12 pairs in group III (early maturing). Minute ventilation (VE), oxygen uptake (VO2), carbon dioxide (CO2) production were measured continuously with a respiratory gas analysis system (Cortex, MetaMax 3B). Body composition (Fat%, FM, FFM) measured using DXA.

Soccer players in group II had significant ($p<0.05$) higher VO_2peak, PA_{max}, VE_{max} values (51.36±6.13 v. 46.23±9.50; 123.27±13.41 v. 103.28±21.43 and 69.50±15.08 v. 57.74±13.48).

In group I and III we found no significant ($p>0.05$) differences in soccer players and control group.

In **conclusion**, soccer specific training was related to physical performance on time maturing group, however in early and late maturing group we found no significant differences in soccer and control boys. However, on late maturing group were maximal performance values significantly lower and relative performance values significantly higher as on time and late maturing group.

PHYSICAL ACTIVITY AND PHYSICAL SELF-PERCEPTION: A ONE-YEAR LONGITUDINAL STUDY AMONG ADOLESCENTS IN ESTONIA

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The **aim** of the present longitudinal study was to follow the development of self-perceptions during early adolescence. Studies among adolescents have demonstrated an association between perceived athletic competence and involvement in sports. Research has shown that self-perceptions are most negative in early adolescence, girls have been shown to have lower self-esteem and a more dramatic decline through this period compared to boys (Zimmerman et al. 1997). Raudsepp et al. (2004) results indicated relatively high stability of the subdomains of physical self-perceptions at a group level, although instability of these self-perceptions at an individual level was observed. Therefore, the present longitudinal study adds a unique point of view to research on adolescents in Estonia. The final samples for this study were 203 adolescents (105 girls, and 98 boys; M age = 15.2 years, SD = .57). Adolescents completed Children's Physical Self-Perception Profile the four subdomain scales (sport competence, physical conditioning, strength, and body attractiveness), the general domain scale of physical self-worth, a global scale of self-worth. The factorial validity of the Children's Physical Self-Perception Profile (CY-PSPP) was tested with Confirmatory Factor Analysis using LISREL 8 [12]. The 36-item measurement model (i.e., six indicators per factor) provides an satisfactory fit to the translated CY-PSPP data (χ^2 (579) = 2416.18, p = .001, RMSEA = .042; NNFI = .92; CFI = .94; IFI = .93). Longitudinal research indicates that the boys' perceptions of condition, sport, body, strength, physical self-worth and global self-worth were higher and they participated more in moderate to vigorous physical activity compared to girls. Sport and physical self-worth domains were the strongest predictors of moderate to vigorous physical activity for boys. Body and condition domains emerged as important predictors for girls. These adolescents had positive self-esteem during the follow-up period. The longitudinal analyses suggested that for boys' physical activity at the earlier age was strongly correlated with physical activity level during the eighth- and ninth-grade years (r = 0.31). Important predictors of later physical activity for boys were physical condition and physical self-worth scale. For girls, previous level of physical activity was not correlated with physical activity at the second measurement (r = 0.15). Other variable to enter the regression equation were body attractiveness and physical condition. Previous longitudinal research (mainly regarding self-esteem) has shown the correlations between two time-points to be high, thus indicating high stability during adolescence and also have concluded that self-esteem is likely to become more fixed or more consolidated with increasing age. Our results demonstrate that physical self-perceptions are significant subdomains to physical activity and very stable at a moderate level during early adolescence.

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THE RELATIONSHIPS BETWEEN MATURATION, PHYSICAL ACTIVITY, AND OBJECTIFIED BODY CONSCIOUSNESS IN THE SAMPLE OF ADOLESCENTS

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Introdaction. Adolescence is one of the most complicated stages in human body development. This period is marked by rapid biological, psychological and social changes (Patton & Viner, 2007). Most researchers determined that adolescence was associated with a decline in physical activity (Bradley et al., 2011; Finne et al., 2011). Some studies consider the stage of maturation as a factor influencing physical activity (Davison et al., 2007). It is thought that the effect of changes occurring on adolescent physical activity during maturation may be associated with psychological factors, for instance, body dissatisfaction (Finne et al., 2011). The purpose of study was to determine the relationships between maturation, physical activity and objectified body consciousness in the sample of adolescents.

Methods. The study comprised adolescents of fifteen 9th forms of Kaunas education insitutions (4 gymnasiums, 10 secondary schools and one lower secondary school). The studied sample consisted of 293 school children, 57 of them did not fill in questionnaires (because of refusal or absence). Thus 236 data of students were analysed, 115 (48.7%) of them were boys. Mean age (SD) of participants was 15 (0.38) years, the youngest was 14, the oldest – 16 years old. The anonymous questionnaires were used to determine physical activity, (Leisure-Time Physical Activity Questionnaire, LTPAQ; Godin & Shephard, 1985) objectified body consciousness (Self-Objectification Questionnaire, SOQ; Noll, Fredrickson, 1998) and sexual maturation level of adolescents (Tanner Sexual Maturation Scale, SMS; Marshall, Tanner, 1969; Marshall, Tanner, 1970).

The results and discussion. Late maturing adolescents were found only in the group of boys. Slighthly more than one-third of boys and almost one-fifth of girls were early maturing. The analysis of association between the stage of maturation and adolescent physical activity showed a negative relationship in the group of adolescent boys. The study revealed that with an increase in sexual maturation stage girls reported higher the rate of objectified body consciousness, however, this trend was not detected in boys. With an increase of maturation stage the rate of drive for thinness was growing in girls and boys. Rates of body dissatisfaction drive for thinness, objectified body consciousness were higher in adolescent girls than that of boys, however, the rate of exercising was lower. Body dissatisfaction, drive for thinness, objectified body consciousness were not associated with physical activity in the sample of adolescents. The study contributes to the researches that assert that sexual maturation is associated with lower adolescent physical activity, however, it is common only in boys. Objectified body consciousness in girls and drive for thinness in both genders are growing when sexual maturation increases. Rates of body dissatisfaction, drive for thinness, objectified body consciousness are higher in adolescent girls than in boys, however, exercising rate is lower. Body dissatisfaction, drive for thinness, objectified body consciousness are not related to adolescent physical activity in the sample.

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SOME INDICATORS OF THE BODY CONSTITUTION AND NUTRITION PECULIARITIES OF HANDBALL PLAYERS

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Proper nutrition is of great importance for both good health and good results (Anderson et al., 2000). Every sportsman who is aiming for high results must understand the importance of nutrition. Well-balanced, rational diet is essential for outstanding performance in any sport activity (Tipton et al., 2007). **The aim** of our study was to determine some indicators of the body composition as well as nutrition peculiarities in handball players and compare with recommended norms.

Research methods. The study included women handball players (n=13), whose mean age was 21±2.7 years and non-sporting women (n=14), mean age 21±1 years. Anthropometric measurements were performed using the weighing scales Tanita Body Composition Analyzer TBF-300. In order to determine the amount of energy obtained from food and consumed food components, the studied were asked to record the amount of food intake per week. Foods were weighed and their amount was recorded (g). These data were later analysed using the tables of food composition (Kadziauskienė et al., 2000). The data of the study were analysed using Microsoft Excel for Windows. Significance of between arithmetic means was determined using two-sided Student‘s t-test for independent samples. Difference was statistically significantly valued if $p<0.05$.

Results and discusion. The analysis of frequency of food intake using food rations recorded by the studied revealed that women sportsmen mostly consumed food 3-5 times per day (85%). Meanwhile, out of all of non-sporting women, 55% had food intake 1-2 times per day, and 45% - 3-5 times per day. Although a 24-hour 2360 kcal are necessary, the handball players received less calories with food (1977 kcal). The amount of calories in non-sporting women (2315 kcal) corresponded the 24-hour energy demand (2319 kcal). The percentage of distribution of energy obtained from food components in the studied handball players was similar and was as follows: 53% of energy from carbohydrates (in accordance with IOC), 33% - from fats but it exceeded energy demand, and 14% of energy from proteins, i.e. in accordance with IOC. Our results were similar to the results of other studies (Burke, 2006).

Conclusions. BMI and fat body mass in all studied coresponded the norms; it was lower in sporting than in non-sporting women. Sporting women had food intake 3-fold more frequently but handball players received less energy over a 24-hour period. Energy obtained from food components partially corresponded the recommendations.

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MECHANISMS OF SKELETAL MUSCLE FATIGUE

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Intense, repeated activation of skeletal muscles causes a decline in performance known as muscle fatigue. The decline in performance includes reduced force production and slower contractions. Changes in many properties may be involved in fatigue development, including impaired neural activation of muscle cells (central fatigue) as well as impairments intrinsic to the muscle cells (peripheral fatigue). Peripheral fatigue may include defects in action potential propagation, sarcoplasmic reticulum (SR) Ca^{2+} handling and/or the function of the contractile elements. A range of mechanisms have been identified which may contribute to the decline of performance and these include changes in ionic composition, metabolite concentration, phosphorylation status and production of reactive oxygen species. Many different activities cause fatigue and an important challenge is to identify the relative importance of various mechanisms in different conditions. Most of the mechanistic studies of fatigue have been performed on isolated muscle and another major challenge is to use the knowledge generated in these studies to identify the mechanisms of fatigue in in humans under normal conditions and in association with various diseases.

BECOMING SKILLED: ENVIRONMENTAL INFLUENCES ON THE DEVELOPMENT OF EXPERTISE

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Many factors contribute to the development of expertise. The contribution of hereditary characteristics and the importance of practice, instruction, and the mentorship of significant others such as parents and coaches are often debated. A common or lay opinion is that elite performers are born rather than made, creating the perception that less ‘gifted’ individuals may continually strive to reach excellence without making the necessary gains needed to become experts in the domain. However, recent research in the sport and cognitive sciences has indicated that individuals achieve excellence through many hours of deliberate, purposeful practice with the specific intention of improving performance. Typically, for example, elite athletes have to devote in excess of 10,000 hours of practice to achieve excellence, regardless of sport. This commitment and continual engagement in practice is the most important determining factor on the path to excellence. Hereditary factors may also be important in helping individuals develop the necessary ‘rage to master’ (i.e., the commitment and motivation to persist in practice over many years). The proposal is that expertise develops as a result of adaptations to the unique environmental constraints imposed during practice and performance. In this presentation, an attempt is made to highlight the practice history profiles of elite performers, with a particular focus on sport, and to illustrate through reference to recent empirical research the type of psychological adaptations that arise as a result of extended involvement in practice. A particular focus will be on the development of perceptual-cognitive skills such as anticipation and decision making in sports like soccer and tennis, as well as in other domains such as law enforcement and medical diagnosis. Practical implications for talent selection and development are highlighted, with attempts to illustrate the nature and type of practice activities most likely to help nurture future generations of experts.

FUNCTIONAL RELATIONS BETWEEN PELVIC FLOOR. DIAPHRAGM AND TRUNK MUSCLES OF MEN WITH PROSTATE CANCER

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Introduction: The absolute dominance of the isolated muscle presentation as the first and last word in muscular anatomy (along with the naive and reductionistic conviction that the complexity of human movement and stability can be derived summing up the action of these individual muscles) leaves the current generation of therapists unlikely to think any other way (Thomas W. Myers 2009).

The **aim** of the study was to evaluate functional relations between pelvic floor, diaphragm and trunk muscles of men with prostate cancer.

Methods: The study included 71 male volunteers diagnosed with prostate cancer. Pelvic floor muscles strength and endurance was measured using „Peritron 9300“ device, the strength of diaphragm was estimated with “MicroRPM“, the strength of transversus abdominis was assessed with „Stabilizer“ and trunk muscles were tested by static endurance of abdominal and back muscles tests one day before surgery.

Results: Analysis of functional indicators of muscles demonstrated high linear relations between strength of pelvic floor and diaphragm (r = 0.79), between strength of diaphragm and exhalation muscles (r = 0.78) and between the static endurance of abdominal and back muscles (r = 0.72). We determined moderate correlations between strength of pelvic floor and static endurance of abdominal muscles (r = 0.59), between endurance of pelvic floor and strength of transversus abdominis muscle (r = 0.59), between strength of transversus abdominis and static endurance of abdominal muscles (r = 0.69), between strength of diaphragm and static endurance of abdominal (r = 0.56) and back muscles (r = 0.51), between the strength of exhalation muscles and static endurance of abdominal muscles (r = 0.57). Low relations were find among the strength and endurance of pelvic floor muscles (r = 0.29) and transversus abdominis (r = 0.31) and static endurance of abdominal muscles (r = 0.44), between endurance of pelvic floor and exhalation muscles (r = 0.37) and static endurance of abdominal (r = 0.32) and back muscles (r = 0.34) and at least between transversus abdominis and static strength of back muscles (r = 0.39). All correlations were statistically significant ((p<0.01). Discussion: The findings showed that functional indicators of muscles are directly relative with each others. The strength of pelvic floor correlates with endurance of pelvic floor muscles, static abdominal and back muscles, strength of diaphragm and transversus abdominis muscles. The results of this study confirm that functional relations between pelvic floor, diaphragm and trunk muscles exist.

THE INFLUENCE OF PRIOR STEP EXERCISE ON THE AEROBIC CAPACITY DURING INCREASING RAMP RUNNING TEST IN YOUNG WOMEN

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Introduction. After unusual physical activities (like bench stepping) including eccentric and concentric muscle contractions we might observe delayed onset muscle soreness (DOMS) which is mostly felt 24-72 hours after physical loads (Yanagisawa et al.. 2010). There is some evidence how prior exercise affects lactate and ventilatory thresholds (Davies et al., 2011). There are no data about the effect of eccentric prior exercise on aerobic capacity changes during increasing ramp running test (IRT). Therefore, **the aim** of this study was to evaluate the effect of prior stepping on the indices of aerobic capacity during increasing ramp running test in young women.

Methods. The subjects were healthy aerobics and dance specializations females students (n = 14) with an average age of 24.7 (6.4) years, height 168.0 (3.5) cm. weight 58.6 (6.4) kg, VO2 max 2.475 (0.344) (l/min) from the Academy of Physical Education. The studies were conducted in the Laboratory of Sports Physiology the Department of Applied Physiology and Physiotherapy. The subjects performed three IRT on a treadmill (LE 200 CE. HP Cosmos) - a control one, 1 hour and 24 hours after stepping prior load (SPL). Maximal Oxygen Uptake (VO_2max) („Oxycon Mobile“, Germany) was determined according the dependence of average VO_2 during 15 s on the work intensity. The first (VeT1) and the second (VeT2) ventilation thresholds were established according to the dependence of pulmonary ventilation. The highest value of VO2 during 15 s of increasing running test was considered as VO2 peak. At 5th and 20th min after IRT capillary blood samples of 0.1 ml from the subjects' fingers were taken using special one time devices using "Accutrend Lactate" (Germany) analyzer.

Results. We established that 1 h after SPL VeT2 ($p = 0.024$). VO2max ($p = 0.049$), maximal aerobic and maximal IRT speed ($p = 0.036$) and [La] 5 min. ($p = 0.007$) were decreased one hour after SPL. The majority of indices (VO2max ($p = 0.030$). the highest test speed ($p = 0.036$) and power ($p = 0.014$) were increased again 24 h after SPL. only VeT2 remained lower though the difference was not statistically significant ($p = 0.898$). Running economy at moderate and heavy intensities, the values of VEmax, HRmax and other indices did not change after SPL.

Conclusion. The second ventilatory threshold and VO2max were decreased only 1h after stepping in young women. Other parameters of aerobic capacity were not changed at this moment of recovery and no significant changes of aerobic capacity were observed 24 h after stepping.

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REACTIVE STRENGTH INDEX IN EVALUATION OF EXPLOSIVE STRENGTH DURING REPETITIVE JUMPING

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Introduction. The reactive strength index (RSI) represents a ratio of jump height and ground contact time. It is typically measured during drop jump (DJ) with an identifiable ground contact time. However, there are many variations of jumps in addition to DJ where RSI might be applied. During repetitive jumping (RJ), for instance, the contact time can be measured using contact mat. The question remains, however, to which extend the RSI differs when is calculated from different exercises. This study investigates the relationship between RSI in drop jumps and repetitive jumps.

Methods. A group of 70 men (age 22.7 ± 3.2 y, height 177.1 ± 9.2 cm, weight 79.6 ± 10.2 kg) performed in random order bounce-drop jump from height of 30 cm and 10-second jumping test. In both cases the subjects were instructed to jump maximally for height while minimizing knee flexion and contact time. Contact time (Tc) and flight time (Tf) were measured by the contact mat with an accuracy of 1 ms using the PC based system FiTRO Jumper (FiTRONiC s.r.o., SK). Height of the jump is calculated by inclusion of flight time as the numerator in the quotient, as follows: $(g. Tf^2) / 8$, where g is 9.81 $m.s^{-2}$. In both exercises, the RSI, e.i. the jump height divided by contact time, was calculated. Pearson correlation was used to assess commonality between RSI from DJ and RJs. The trial-to-trial reliability for both RSIs was estimated using intraclass correlations.

Results. High ICCs for RSI calculated from DJ and RJs (0.911 and 0.924, respectively) indicate that both methods can be considered as a reliable. The contact time was significantly ($p<.05$) lower in RJs than in DJ (0.197 ± 0.032 s and 0.244 ± 0.043 s, respectively). However, there were no significant differences in jump height between RJs and DJ (26.2 ± 4.9 cm and 27.4 ± 4.6 cm, respectively). Nevertheless, the RSI was significantly ($p<.05$) higher in RJs than in DJ (128.3 ± 24.5 cm/s and 116.5 ± 20.4 cm/s, respectively). Additionally, moderate correlation ($r = 0.667$) between RSI calculated from DJ and RJs was found.

Discussion. In spite of longer contact time in DJ than in RJs, subjects were able to achieve similar height jump in both tests. This may be explained by low correlation between contact time and jump height in both DJ and RJs. Feldmann et al. (2012) suggest that ground contact time (GCT) represent unique performance characteristics not related to drop vertical jumps (DVJ) displacement. This assumption was based on low correlations of DVJ displacement with GCT and moderate with RSI. In our study, the correlation coefficients between RSI and height jump, as well as between RSI and contact time were both above .75, which is called high degree of correlation. Thus, higher jump height and/or lower contact time, the higher RSI. Since there was similar jump height in both tests, lower contact time in RJs than in DJ might account for higher RSI. In other study of Lloyd et al. (2011) squat jump height best

explained the total variance for RSI during a maximal hopping test. Ebben and Petushek (2010) suggested to use the modified RSI (RSI_{mod}) which replaces ground contact time with time to take-off in the equation. The analysis of RSI_{mod} revealed significant main effects for plyometric exercises including the countermovement jump (CMJ), tuck jump, single-leg jump, squat jump, and dumbbell CMJ. Contrary to this, in our study the extent of CM during jumps was as minimal as possible suggesting evaluation of different characteristics of jumping performance. This method of calculating RSI from RJs may provide additional information on explosive strength in practicioners performing vertical rebound jumps rather than drop jumps (e.g., aerobic or rock & roll dancing). The conditioning specialists should select from a wide range of vertical jump and rebound tests these, which are close to specific demands of particular sport.

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EFFECTS OF FOUR DAYS COMPETITION MODELLING & SIX DAYS OF TAPERING TO SPORT PERFORMANCE IN YOUTH GOLFERS: CASE STUDY

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Introduction. Research and professional experience support the concept of specifity of training in that the more conditioning mimics the physiological demands and conditions of competition, the greater the performance improvement is to be expected (Rhea, 2006). With tapering, fitness and skill should reach relatively high levels such that through physiological and psychological adaptations, the level of performance is optimized (Pyne et al., 2009). In general Lithuanian golf competitions lasts one day and golf players are always playing from yellow teeing grounds, but Lithuanian amateur open golf championship 2011 (LAOGC‘2011) continued three days and golf players had to play from white teeing grounds. *The aim of the research* was to determine and assess the effects of four days competition modelling & six days of tapering to sport performance in youth golfers.

Methods. Two male golfers (subject A: age 17 years, height 1.75 m, body mass 62 kg, basal heart rate 47 beats·min^{-1}, handicap 10.1; subject B: age 17 years, height 1.87 m, body mass 68 kg, basal heart rate 54 beats·min^{-1}, handicap 11.2) participated in this study. The experiment (13-days in „Capitals GC”) consisted of three stages: 1st – four days of competition modelling; 2nd – six days of tapering; 3rd – three days of LAOGC‘2011. Sport performance indicators (using sport performance personal statistical protocol), locomotion and physiological demands (using FRWD W^{400} Series, Finland, device) in the 1st stage, training loads (using training programs) in the tapering stage, and sport performance indicators (using results protocols of LAOGC‘2011) in the main competition were recorded and analyzed.

Results. *Competiton modelling. Sport performance indicators.* Scoring average – 87.25±4.65 (total 349) and 86.25±1.89 (total 345), driving accuracy (%) – 71.15±11.54 and 69.23±6.28, greens in regulation (%) – 41.67±13.23 and 43.05±2.78, scrambling (%) – 8.85±6.17 and 15±12.91, putts per round – 37±1.15 and 37.5±0.58, respectively of subject A and B. *Locomotion indicators.* Both subjects played the same duration in average (4.22 h). Over this time players covered near 10 km, i.e. they exceed 60% compared with course distance from white teeing grounds. *Physiological demands.* HR response (beats·min^{-1}) – 112.75±2.99 and 110.75±3.1, HR_{max} (beats·min^{-1}) – 158.5±3.11 and 155±3.37, total energy expenditure (kcal) – 1485.75±72.31 and 1621.75±80.47, VO_{2max} (mL·kg^{-1}·min^{-1}) – 43.25±0.96 and 41±1.83, training effect (tells how the workout improves aerobic fitness; scale 1–5) – 1.25±0.06 and 1.23±0.05, respectively of subject A an B. *Tapering.* Reduction of training frequency (25 %) and volume (16.67 %) in the practice areas, and frequency (33.33 %) of playing in the golf course was determined compared with period before tapering. Subjects did not perform any physical conditioning trainings during season. *LAOGC‘2011.* Both subjects showed high performance: they took 7th and 8th places in the LAOGC‘2011, while they won 2nd and 3rd places in the Lithuanian rank. Subject A score negatively increased round by round: 1st day – 75 (career record), 2nd day – 84 and 3rd day – 87 strokes (total 246). Subject B score (82÷84 strokes; total 249) was stable over all three days.

Discussion & Conclusions. In an effort to increase the transfer of training to sport performance, sport-specific training programs should be developed (Rhea, 2006). Effective taper improves sport performance of athletes about 2–3 % (Pyne et al., 2009). Combination of four days of competition modelling and six days of tapering is effective method to improve sport performance (scoring average positively decreased: A 6.02 %; B 3.77 %) in youth golf.

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PECULIARITIES OF JUMPERS VERTICAL MOVEMENT DEPENDENT ON THEIR HEIGHT

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The sport results of the high jumpers are influenced by the height of the General Body Mass Centre (MC) before a take-off from the ground, the vertical velocity of the MC after the take-off and the position of MC above the bar at the stage of jumping over it (Ae et. al., 2008). To seek for the best performance in the high jump event, we should pay attention to the physical and fitness preparedness, technical skills as well as psychological condition of athletes (Ae et. al., 2008; Lauger, 2007; Балахничёв и др., 2007; Косихин, 2009). **Aim** of Research: To determine peculiarities of results alteration of High-Jumpers dependent on their height.

Subjects: The Elite Lithuanian and World Male (n=35) and Female (n=12) High Jumpers.

Methods of Research: 1. Analysis of literature sources and documentation. 2. Statistical analysis.

Results of Research: It was determined that the Elite Lithuanian and World Male High Jumpers (n=35), whose average tallness was 1.92±0.01±0.06 m, would jump over 2.36±0.01±0.04 m high, which was by 44.23±1.07±6.34 cm above their tallness. The High Jumpers (I group, n=11), who were 1.98±0.01±0.03 m tall, would jump over 2.37±0.01±0.04 m, which was by 39.09±1.58±5.22 cm above their tallness. The other High Jumpers (II group, n=13) being 1.92±0.01±0.02 m would jump over 2.35±0.01±0.03 m, which was by 43.23±0.93±3.35 cm above their tallness. The shortest High Jumpers (III group, n=11), whose average tallness came to be 1.85±0.01±0.03 m, would jump over the height of 2.36±0.01±0.03 m, which was by 50.55±1.41±4.68 cm above their average tallness. It was determined that amongst all the three groups of subjects their tallness difference was significant ($p<0.001$), yet the achieved sport results did not differ significantly ($p>0.05$). The indices of difference between the bar height jumped over by the High Jumpers and their tallness were also significant (from $p<0.001$ till $p<0.05$). The Elite Lithuanian and World Female High Jumpers (n=12), who were 1.81±0.02±0.07 m tall, would jump over the 2.03±0.01±0.05 m bar height, which on average would make 22.25±2.43±8.43 cm above their tallness. Thus such a tendency, when the shorter High Jumpers would jump over a bar significantly higher than their average tallness, was determined in both Male and Female cases. Those Female High Jumpers (n=4), who were 1.88±0.02±0.03 m tall, would jump over 2.01±0.03±0.07 m, which was by 12±2.04±4.08 cm above their tallness. The shorter Female High Jumpers being 1.81±0.02±0.03 m tall (n=4) would jump over the 2.04±0.02±0.04 m height, which made 23.5±2.22±4.43 cm above their tallness. At last the shortest Female High Jumpers (n=4), who were 1.75±0.02±0.04 m tall, would jump over the bar at 2.03±0.03±0.05 m, i.e. 28.75±3.20±6.40 cm above their tallness. We could conclude that certain general consistency was observed, wherein the taller Male and Female athletes would jump less over their tallness, compared to those, who were shorter. The tallness of athletes does not influence their sports results achievement. The achieved research results confirmed that just anthropometric indices do not completely reflect athletes movement abilities when they would perform vertical jumps.

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THE IMPACT OF REGULAR PHYSICAL ACTIVITIES ON FEMALE STUDENTS PSYCHOEMOTIONAL STATE AND RESILIENCE PARAMETERS (PILOT STUDY)

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The interrelation of physical activity and mental health may be explained via different biochemical, physiological and psychosocial mechanisms. The research proves that physically active people have less complains on anxiety and emotional stress symptoms, comparing to physically passive people. Resilience as an ability to withstand and rebound from crisis and adversity is becoming an increasingly significant concept in health promotion and well-being. Resilience is the presence of protective factors or processes that buffer effects of adversity. Resilient individuals have learned to use skills and resources they have available to their best, and are active participants in creating their own environment. The aim of this pilot study was to find out if the regular physical activity of moderate intensity (2 times per week of fitness aerobics) has an impact on resilience as well as symptoms of depression and anxiety. Two questionnaires were used in this study: *Hospital Anxiety and Depression Scale (HADS)* provides information on the potential presence as well as the severity of anxiety and/or depression disorders; *The Resilience Scale for Adults (RSA)* comprises five factors which can be divided into the following categories: (1) positive characteristics and resources of the individual; (2) a stable and supportive family environment marked by coherence; and (3) external social networks that support and reinforce adaptive coping. 51 female student (age 19-24) attending fitness aerobics workouts (held two times per week, duration 1 hour) were tested. 15 participants were retested in two months aiming to determine possible changes. Test and retest mean scores of both measures including subscales were calculated and compared using t-test for paired samples. Parameters of internal reliability and correlation parameters between the two surveys were then calculated for RSA.

The overall mean score of RSA increased from 179.17 to 184.33 (p-0,007). Scores of social competence and social resources domains increased most clearly, while scores were stable or slightly decreased in others such as planned future and perception of self. The overall mean as well separate anxiety and depression scores of the HAD measure slightly decreased (overall mean from 10.53 to 9.20, mean for depression subscale from 3.07 to 2.20, that of anxiety subscale from 7.47 to 7.00, $p>0.05$). Internal reliability of RSA expressed by Cronbach α for the overall measure was good at 0.862. Cronbach α for separate domains was satisfactory but slightly lower between 0.639 for planned future and 0.786 for family cohesion. Test-retest correlations for overall scores of RSA were strong and significant (Pearson correlation – 0.731, p-0.007; Spearman's rho - 0.769, p-0.003). Correlations of separate domains varied between small and non significant correlations for planned future (Pearson correlation – 0.236, p-0.416; Spearman's rho – 0.228, p-0.433) and strong significant correlations for family cohesion (Pearson correlation – 0.864, p-0.000; Spearman's rho 0.732, p-0.004).

Overall resilience expressed by RSA increased while respondents were engaged in regular physical activity. During the same period symptoms of depression and anxiety seem to have decreased, although score changes were not statistically significant. Results of this pilot study allow authors to continue and develop this research specifying it, increasing sample size, including (non-sporting) control group, using more precise instruments for identifying participants' physical activity level.

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SPECIFICITIES OF THE CARDIOHEMODYNAMICS PARAMETERS VARIABILITY IN PERSONS WITH THE INCREASED MOTOR ACTIVITY

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Investigation of cardiohemodynamics parameters variability is not given much of attention. The studies mainly focus on the investigation of the heart rate variability (HRV). Thus, in 1996 European Association of Cardiology jointly with the American Association of Rhythmology organized a group of experts which presented standards of the HRV measurement. We consider investigation of the human body vegetative status to be incomplete without taking into account mechanisms of arterial pressure, cardiac output and peripheral resistance control. This is proved by the results obtained by V.V. Naumov and A.A. Astakhov on examination of different cohorts of people. In this connection the study of cardiohemodynamics parameters variability is of great significance, there currently being no unanimous approach to analysis and interpretation of the findings obtained in the course of application of the given method.

A total of 28 girls and 29 young men representatives of the cyclic types of sport of the first or second class, and 45 girls and 60 young men who did not go in for sports took part in the study. They exercised on veloergometer for 5 minutes and physical load was given at 2,3v/kg of body mass. Investigations of the blood circulation system were carried out by means of multifunctional complex of multiparameter monitoring, which performed recording of electrocardiogram and rheogram. Registration of bioimpedance monitorting data was done in conditions of real time with subsequent spectral decomposition of their variability for 500 heart beats. ECG was recorded in the II standard lead. Trend presenting the sequence of the definite parameter indices (a total of 500 recordings registered with each heart beat). Calculation of capacity in four ranges of frequencies was accomplished on the basis of spectral analysis by automatic device. The data obtained were also subjected to correlation analysis.±

While studying spectral capacity of variable cardiohemodynamics indices it was found out that:

1. Young sportsmen demonstrated high spectral capacity in arterial pressure variability (AP) – 3,52 ±0,85 ms², while in girls it was 1,13±0,33 ms² (p< 0,01), stroke volume 23,33± 3,82 ms² in young men and 12,33± 2,77 ms² in girls (p< 0,05), and contractile ability – 31,37± 2,90 % in young men , and 20,39± 3,38% in girls (p<0,05), which can be viewed as specific form of adaptation of blood circulation control among young men.

2. Increase of spectral capacity of cardiohemodynamics parameters variability (according to correlation analysis data) in sportsmen did not result in increase of slow waves capacity which testifies to better stability of the systems of blood circulation control.

3. In response to physical exertion both young men and girls going in for sports demonstrated changes of spectral capacity in sympathetic control. Young men displayed changes in spectral capacity in absolute values in the heart rate variability 6,59±1,18 ms² to 3,76±1,05 ms² (p< 0,01), stroke volume from 23,33±3,82 ms² to 11,32±2,8 ms² (p< 0,01), amplitude of aorta pulsation from 57,82±9,63 ms² to 34,62±7,36 ms² (p< 0,01),contractile function from 1,11± 0,17 to 0,14±0,09ms² (p<0,01) and respiratory waves of microvessels from 241,55±60,79ms² to 477±110,62ms² (p<0,01). Among girls significant changes were noted in the heart rate variability, stroke and minute blood volumes, contractile ability, and respiratory waves of microvessels.

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EVALUATION OF BODY MASS COMPONENTS, EXTERNAL RESPIRATION AND AEROBIC CAPACITY IN 15-16 YEARS OLD VOLLEYBALL PLAYERS

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The object of the research is to investigate and evaluate the body mass components and the aerobic capacity in volleyball players.

The methodology and organisation. The members of the Lithuanian junior women volleyball national team (LJWVNT) have taken part in the research. Nineteen sportsmen participated in the examination of the state of the external respiration function and body composition. The following methods were applied: the analysis of scientific literature, testing, veloergometrics, and statistics.

According to the data of the best test the forced expiratory volume (FEV) was measured (3–5 tests were carried out). After a few minutes of rest the test of maximal voluntary ventilation (MVV) was carried out. The sportswomen were asked to breath as deeply and frequently as they can for 12 seconds. Two tests were carried out with the break of 5 minutes; the index of the best result was regarded as the MVV of the researched. In order to determine the aerobic capacity after the warming up (5 min of work 25—50 W running on a treadmill) the researched performed uninterruptedly increasingly load by 21 W every minute while running on a treadmill. The running frequency was 70 r/min. The initial load was 70 W. The heart rate (HR) was registered by the pulse meter *S810* (Polar. Finland). Later HR of every load was calculated during the last 10 seconds of every minute. The load was being increased until tiredness, i.e, until the researched could perform a new load. After that the could have a rest for 5 min in lying position.

The results. The body mass is normal if the BMI varies between 20 and 25 (Skyrius, 2005). The results of the research have revealed that the average BMI of the members of the LJWVNT is 21. The first degree nutrition deficiency was diagnosed for two researched sportswomen. The BMI of the most researched volleyball players was normal. The results of the research have shown that the average relative amount of body fat in the members of the LJWVNT is 25%. In literature recourses (Skyrius, 2005) this limit is regarded as acceptable for the sportsmen up to 17 years old. The relative amount of body fat in two researched sportswomen exceeded 30%, this boundary is concerned as a very big value in the literary sources. The first ventilatory threshold (VT1) of members of the LJWVNT achieved by increasing consistently the running load during the test provided a remarkable statistical difference ($p<0.01$). The average value of VT1 while running was 90 W. The second ventilatory threshold (VT2) of the members of the LJWVNT (calculated directly according to the shift of respiration indexes) during the consistently increasing running test statistically differed even greater ($p<0.001$). The average value of VT2 while running was 154 W. The absolute consumption of oxygen by the members of the LJWVNT at the first and second ventilatory thresholds is statistically remarkable ($p<0.05$). The average value at the first threshold while running was 2.1 l/min. The average value of the second threshold was 2.5 l/min. The HR at the first and second ventilatory thresholds also remarkably differed ($p<0.05$). The average HR at VT1 while running was 163.1 r/min. The average HR at VT2 while running was 188 r/min. The average speed index of the running test by the members of the LJWVNT reached 14.01 km/h. The average value of relative maximal oxygen consumption (MOC) by the members of the LJWVNT was 41.6 ml/kg/min. while the same value by the French highest level volleyball players was 52.7 ml/kg/min. The highest value of the relative MOC by the members of the LJWVNT was 43.8 ml/kg/min. and the lowest value was 39.1 ml/kg/min.

The conclusions. 1. The method applied allows evaluating the possibilities of the external respiration function and objectively identifying the organism‘s functional state. 2. It has been found out that the BMI of the members of the LJWVNT comply with the norms. 3. The comparison of the relative and absolute MOC by the members of the LJWVNT and the French highest level volleyball players has revealed that the aerobic work capacity of the Lithuanian junior players is lower.

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IMPROVEMENT IN THE BODY SHAPE AND PROPORTIONALITY OF HIGH AND LOW PROFILE ATHLETES – SOMATOMETRIC AND MORPHOMETRIC FEATURES.

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This research is concerned with the establishment of models of adaptive morphometric changes of bones and muscular tissues as well as somatotypical volumetric alterations in the ratios of various human components during intensive physical training for elite athletes in selected disciplines.

The purpose of the study was to examine the dynamic formation of existing components of somatotype and some other morphometrical indices in athletes involved in the sports of football, basketball and kayaking. These types of sport were selected according to the criteria of high levels of physical activity and strong power of performance. There is also the suggestion of some special needs and requirements for the athletes involved in these sports to probably change their body constitutional characteristics (height. weight. segmental proportions. particularly for the upper and lower limbs. and the appearance of the optimal ratio in human physique shape).

The methodology and organisation. Two groups of 72 young men from 18 to21 years old were investigated. The first groups (10-12 people per group for each individual sport) included perspective beginners while the second groups (with the same number of people with the same age) included elite, highly experienced athletes performing at international level.

The assessment of somatotype was based on 16 somatotype parameters using standard methods and licensed anthropometric instruments. Other longitudinal dimensions of the body were measured by means of special anthropometrical licensed equipment.

For a quantitative description of each somatotype the endometric, mesometric and ectometric indices were calculated. This approach makes it possible to follow development of the partial physical changes more accurately. For a more accurate assessment of body proportions, which may be suggested as one of the main indicators of improvement in athlete's phenotype and somatotype, we additionally calculated the longitudinal location of his center of mass (how closely it related to the second sacral vertebrae) and projected this onto the vertical axis of the body.

The results. It was found that the elite athletes, representatives of all three kinds of sport, showed partial changes in their somatotype in comparison to beginners. The greatest changes were observed in the mesomorphic indices. The greatest degree of change was observed in the mesomorphic component of elite kayakers compared to beginners. Explanation of this observation can be attributed to the maximal force generated by this group of sportsmen mostly exercising within the anaerobic range of muscular work. This regime leads to intensive development of intramuscular connective tissue and hypertrophic changes particularly of fast muscle fibers type 2A. These changes may cause the significant alterations within the mesomorphic component.

For each sport, changes in longitudinal growth of the body were measured that were most dramatically demonstrated by basketball players. An important result of the study was finding a high degree of correlation (0.76 - 0.95; $r^2 = 0.94$) between change of height and longitudinal axes of the segments of upper and lower extremities.

Kayakers have revealed some very important changes in the patterns of body proportions, further characterizing adaptation to the sport. The kayakers have gradually demonstrated lowering of their center of mass ($P<0.05$), which provides required improvement in the stability of the boat under conditions of constant change of the lateral force vector.

The soccer players, despite intensive coaching involving bipedal exercise, did not demonstrate the anticipated symmetry of dominant and non dominant leg sizes. This observation may indicate that in soccer a natural morphological asymmetry of limb length is preferable and may be treated as a necessary condition for the effective release of natural crossed-extensor reflexes.

The conclusions. These results suggest with high probability that there is dynamic change in different aspects of morphometric phenotype of selected kinds of sport athletes. These phenomena may be explained by the effects of continuous intensive training and achievement of highly sport-defined shapes.

SHIFT OF INDEX OF LEG MUSCLES' EXPLOSIVE POWER IN FEMALE VOLLEYBALL PLAYERS

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The object of the research is to explore the index shift of the leg muscular explosive power of volleyball players.

The methodology and organisation. The research was carried out during the sporting season (the period of the Lithuanian women volleyball championship. competitions and after competitions). The participants of the research were the players of women volleyball team (n=25). During the research volleyball players practiced 4 times a week before and during the competitions including a session at the training gym. During the practice at the training gym the sportswomen were given the exercises to develop the velocity strength of leg muscles as well as to maintain a general physical fitness of other muscle groups. The focus of the rest training involved improving the volleyball technical skills. The research applied the following methods: testing, tensometrics and statistics.

During the research the volleyball players were tested for 5 times. The testing process took place at the sports hall. A standard tensoplatform was used to estimate the parameters of leg muscular explosive power in volleyball players. The sportswomen were asked to perform a series of three types of jumps: a standing high jump without an arm swing (hp 90), a standing high jump while using an arm swing (hpm 90) and a high jump with a run-up and arm swing (him). The jumps were performed starting from the crouch down position with the knees bent at a 90 degree angle.

The volleyball players were asked to repeat the jump for five times. With the help of tensosensors the researcher measured the following parameters of the jump: height, duration, the phase of the flight, the power of the take-off. Prior to each testing the sportswomen had to carry out warm-up.

The results of the research. The purposeful jumping training programme has positively affected the shift of the jumping index of the student volleyball players. We think that the performance has been improved remarkably due to the regular loads which develop the jumping skills (Kamandulis ir kt.. 2010) and the results of the high jump have been gradually improving because the sportswomen have learnt to carry out the movement-jump better (Takahashi et al.. 2006). The quality of high jump is affected by a number of factors. The results of the take-off time duration and the shift of jump height achieved during the research allows drawing the assumption that the height of the jump of the sportswomen was increasing on the account of the component of power. Although the main features of the motor programme of the jump performance form in quite early years of life still it is improving in later periods of ontogenesis. However, the motor programme, just as other reflective and muscular mechanisms, can be modified according to the type of jump, performance skills and degree of concentration. Therefore, some researchers indicate that the run-up and arm swinging add about 20–30 % height to the jump. Our research data has also proved this. We managed to determine that during the same process of testing the results of a standing high jump with an arm swing are 5–8% ($p>0.05$) higher than that of a jump without arm swinging. And while performing a high jump with a run-up this difference may reach up to 25% ($p<0.001$). This is shown by the correlation relationship between these parameters ($r=0.7–0.8$). The results has once again proved the patterns of the organism's adaptation to physical loads which depend on various factors like: psychological; the precision of the formed motor programme which affects the coordination of arm and leg muscles that help to convey the jump better; the composition of muscles as well as other factors.

The conclusions. 1. It has been determined that the height of the jump of the volleyball players was increasing in relation to the component of power. 2. It has been analysed that a remarkable influence ($p<0.05$; $p<0.001$) to the results of a high jump is performed by an arm swing and run-up.

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MANIFESTATION OF LIFESTYLE PECULIARITIES – INCLINATION FOR SPORTS. SELF-ESTEEM AND PAST-TIME ACTIVITIES – OF SCHOOLCHILDREN ENGAGED AND NOT ENGAGED IN SPORTS

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The **aim** of the research was to establish and compare the manifestation of health related life-style peculiarities – inclination for sports, self-esteem and past-time activities – of junior school-age children. Objectives: 1) to establish the peculiarities of manifestation of the inclination for sports among schoolchildren engaged and not engaged in sports; 2) to reveal the peculiarities of self-esteem of schoolchildren engaged and not engaged in sports; 3) to analyze and compare physically active and passive past-time activities of schoolchildren engaged and not engaged in sports.

Research methods and organization. The study employed a questionnaire researching lifestyles in an international project initiated by Sports Science Institute in Koln. The questionnaire was adapted for Lithuanian schoolchildren. The subjects were fourth-grade pupils randomly selected from different regional schools. Aiming to establish the similarities and differences in lifestyles of schoolchildren engaged and not engaged in sports we divided the children into two groups (engaged and not engaged in sports) on the basis of the question “Do you attend a sports club?” We processed the answers of 380 girls and 413 boys.

Research findings suggest the following conclusions. More than half of the subjects (54.2 %) attended a sports school or club. In the aspect of gender, boys choose the institutes of informal education more often than girls (65.1 % and 43.4 % respectively, $\chi^2 = 24.63$; $p < 0.001$). Boys and girls engaged in sports evaluate the significance of sport higher compared to their counterparts not engaged in sports ($p < 0.001$). The majority of schoolchildren (90.4 – 78.4 %), no matter if they participate in sports or not, do not think that physical activity is a waste of time. However, children who are not engaged in sports more often avoid vigorous sports activities ($p < 0.001$). Children engaged in sports more often choose sports as their past-time activities ($p < 0.001$). But a sport is not a kind of activities which suppresses other interests in both groups of subjects, engaged and not engaged in sports.

Research **results** show that the majority of fourth-graders have positive self-esteem, but there is a tendency that children engaged in sports demonstrate a higher level of self-esteem. Boys engaged in sports demonstrate higher self-respect ($p < 0.05$) and are of higher opinion about themselves ($p < 0.05$). Girls engaged in sports are happier about themselves that those not engaged in sports ($p < 0.05$).

Analyzing the past-time activities of schoolchildren we considered their active and passive forms. Children have out-door activities every day or several times a week – 81.7 % of boys engaged in sports and 81.3 % - not engaged in sports, and 74.7 % of girls engaged in sports and 75.8 % of girls not engaged in sports (no statistical significance was established, $p > 0.05$). More boys than girls tend to spend their leisure time passively at the television or computer. This time increases at weekends, and it is characteristics for both children engaged and not engaged in sports. However, boys engaged in sports spend less time at TV, DVD and video films compared to their counterparts not engaged in sports ($p < 0.05$). About one fourth of junior schoolchildren spend 3 or more hours at the computers every day, and at weekends their number increases to 40 %. It is common for both children engaged and not engaged in sports.

ELBOW AND WRIST JOINTS MUSCLES STRENGTH OF THE YOUNG TENNIS PLAYERS

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Tennis, as type of sport, has a lot of technical elements, which are based on dominant arm work, other body segments as well as nondominant arm performing support and compensatory functions. This observation allows to assume that tennis is an asymmetric sport. Because of this, the study of tennis-specific mechanical load influence on tennis player locomotor system is interesting from the point of view of scientific and practical coaching work. This theme is relevant nowadays especially due to popularity of early specialization in children. Aim of the work was to perform a study of the elbow and wrist joints muscles' strength of the young tennis players. Upper arm muscles, which realize different phases of tennis strokes, are largely responsible for the development and deceleration of racquet velocity [2]. Six 11 years old girls, weight 42.0 kg (± 5.5), height 157.2 cm (± 5.9) have participated in tests performed with use of Technogym's isokinetic device REV-9000. This machine is one of commonly used strength-testing devices, is practice adopted and is widely used for clinical studies. Isokinetic device tests the muscular strength capabilities, it allows to stabilize and position the tested tennis player, isolates required joint for testing on required physiological parameters [1, 3]. System is computer controlled and includes a gravity correction option. The testing mode consisted from specific joint warm up 60s, after followed 6 x 3s isometric muscle work with 20s passive rest and after 60s cool down continuous passive motions. Verbal and visual feedbacks were utilized to increase the motivation of the subjects. Our study was accepted by Latvian Academy Sport Education ethics commission. The control exercises were elbow flexion and extension, wrist flexion, extension, pronation and supination. The more significant trends of right side dominance were observed in following testing exercises: elbow flexion (average results of the group 19% of right side dominance), wrist extension (28% of right side dominance), and wrist supination (23% of right side dominance). The greatest muscles bilateral asymmetry were found in right elbow (21% of flexors dominance), left wrist (44% of flexors and 39% of pronators dominance). To insure the harmonic development of locomotor system of young tennis players, physical condition coaches need to pay more attention to test body right/left side and bilateral muscle strength. And based on the results, it's possible to design and implement an individual training programs. The question of tennis specific mechanical load effect on young tennis players' locomotor system requires more detailed study.

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