ABSTRACT BOOK

IX INTERNATIONAL BALTIC SPORTS MEDICINE CONFERENCE
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IX INTERNATIONAL BALTIC SPORTS MEDICINE CONFERENCE
(SHORT ORAL PRESENTATIONS)
SELF-COACH AGREEMENT ON EATING BEHAVIOUR IN ATHLETES

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PURPOSE: Previous research has shown that athletes have a higher risk for disordered eating compared to general population. In this study we focused on disordered eating behaviour in aesthetic sports. We aimed 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 in Estonian. 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), tennis and basketball players (n = 18) and their coaches (n = 14). All athletes were between ages of 12-26 years.

RESULTS: Results demonstrated that although the correlations between athletes’ self-reported eating behaviour and their coaches’ estimations are positive and statistically significant for a few aspects of disordered eating attitudes, coaches tend to underestimate the severity of a number of features indicating risk for disordered eating.

CONCLUSIONS: Coaches can not consistently accurately estimate the amount and frequency of disordered eating behavior and attitudes toward eating of their individual athletes. More attention should be payed to coaches’ knowledge about eating behavior and disordered eating.
MOTOR FUNCTION AND PHYSICAL ACTIVITY CHARACTERISTICS IN FEMALE CASHIERS WITH AND WITHOUT MUSCULOSKELETAL DISCOMFORT

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\textbf{PURPOSE:} Musculoskeletal discomfort (MSD) is one of the most frequently suffered musculoskeletal symptoms among workers, including supermarket cashiers, affecting their performance, and increasing absenteeism. The aim of the present study was to evaluate motor function and physical activity (PA) characteristics in female cashiers with and without MSD.

\textbf{METHODS:} For assessment the prevalence of MSD and PA (first part of this study) 96 female cashiers aged 18 - 63 years volunteered to participate. All participants filled the Nordic Questionnaire and Baecke habitual physical activity questionnaire. Motor function characteristics in laboratory condition (second part of the study) were measured in female cashiers with MSD (n = 14) and without MSD (n = 10). Maximal isometric voluntary contraction (MVC) force of back extensor muscles were measured by back dynamometer. Static standing stability was assessed on force plate. The spinal curvature in the sagittal plane was recorded using pantography. The back active range of movement (aROM) was measured by goniometer.

\textbf{RESULTS:} MSD during last 6 months in female cashiers was located primarily in the lower back (68.8%), neck (55.2%) and wrist/hand (49.0%) areas. MVC force of back extensor muscles was 17.3\% lower (p < 0.05) in cashiers with MSD compared to cashiers without MSD. Cashiers with MSD showed larger (p < 0.01) anterior-posterior sway during standing when eyes were open, and larger (p < 0.05) medio-lateral sway when eyes were closed. Cashiers with MSD showed greater (p < 0.05) angle of thoracic kyphosis and less (p < 0.05) aROM during back rotation to left than cashiers without MSD. Almost half of cashiers (49\%) were physically active, performing regular leisure time sports. Baecke PA scores were lower in cashiers with than without MSD. Baecke PA total score correlated positively with aROM during back lateral flexion to right (r = 0.70), and sport score correlated positively with aROM during back rotation to left (r = 0.64).

\textbf{CONCLUSIONS:} In female cashiers, back, neck and wrist/hand regions were the most affected by MSD. Cashiers with MSD had a markedly lower back extensor muscle isometric force-generation capacity, standing stability, and back aROM during rotation to left than cashiers without MSD. They had also greater thoracic kyphosis of spine. PA in cashiers was associated with aROM during back lateral flexion and rotation.
MICROWAVE THERAPY IN THE REDUCTION OF MIOFASCIAL TRIGGER POINTS ACTIVITY

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PURPOSE: To determine the options to use local microwave therapy for myofascial trigger point (TP) activity decreasing.

METHODS: TP activity level in the upper part of the trapezius muscles was estimated by pain intensity at standard pressure on TP with original device in 10 point system. Microwave therapy method was applied for five consecutive days by Alpha-Stim®100 (EPI, USA) with 100 Hz frequency and amperage 600 mA or lower – according to the individual sense of comfort. Duration of each procedure was 20 minutes.

RESULTS: At the beginning of the research the pain intensity in the group, measured by pressing trapezoid muscle TP was on average 7.9 ± 0.3 points, which is characterized by high sense of pain. After undergoing the first therapeutic microwave procedure, the pain intensity in the group decreased to the average of 4.5 ± 0.3 points, what is 43.0% less. On the next day the sense of pain partially returned, but it was for 1.9 points less than at the beginning; and after the 2nd procedure it reduced to 4.0 points or 33.3%. After the last-fifth day, the pain intensity in the group reduced to the average of 2.9 ± 0.4 points or 63.3% less (p < 0.05) than in the beginning.

CONCLUSIONS: Alpha-Stim®100 microwave procedures on Trapezius muscle statistically significantly (p < 0.05) reduced TP activity, what was estimated by pain intensity reduction, as well as movement range improvement. The obtained results allowed to conclude that microwave therapy is an effective method of myofascial TP activity reduction and can be recommended as a therapy method in physiotherapy for sportsmen.
THE THERAPEUTIC EFFECT OF CALCIUM AND VITAMIN D INTAKE IN FOOTBALL INJURIES

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PURPOSE: Calcium and vitamin D are important components of nutrition to improve bone density and prevent fractures at all ages, this is twice important for young athletes who are subjected to high intensity loads, such as for example in football. Football is high intensity sport game with rapid acceleration, moving direction changing and others sport situations which increase injury risk. The question of injury prevention and healing process acceleration is actual in young football players. The purpose of the study was to investigate an effect of Ca and Vit D intake on regenerating and accelerating tissue healing, including musculoskeletal injuries in sports by investigating some biochemical blood parameters in young football players during three weeks study.

METHODS: 33 male football players volunteers participated in this study (mean age 20 ± 3 years). Participants were divided into two groups according to usage of daily Ca and Vit D intake or not. The dose of daily Ca and Vit D intake was 2500 g Calcium and 880 IU of Vit D. Plasma levels of blood creatine kinase (CK), alkaline phosphatase (ALP) and Free T4 were obtained in venous blood samples before and after three week heavy training period.

RESULTS: There was a significant positive correlation between Ca and Vit D intake and creatine kinase (CK) $p = 0.015$ where $p < 0.05$, and alkaline phosphatase (ALP) is $p = 0.01$ where $p < 0.01$.

CONCLUSIONS: The results of this study indicate, that Ca and Vit D intake is evaluated to be helpful to accelerate tissue healing and speed recovery period in sports injuries.
FEATURES OF UPPER CROSSED SYNDROME IN PHYSICALLY ACTIVE 9-14-YEAR-OLD CHILDREN

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PURPOSE: To find out the quantity of the upper crossed syndrome (UCS) among physically active 9 - 14 year old children.

METHODS: The cross-sectional study included 67 schoolchildren: age 11.42 ± 1.67 (\(\bar{x} \pm SD\)); BMI 17.90 ± 2.65; physical activity (physical education + training) 6.52 ± 1.6 times per week. Body posture was assessed visually in the sagittal plane (neck position, chest position, shoulders position and upper back position) using the New York State Posture Rating Chart. Each posture component was rated on a scale from five to one: 5 was normal position, 3 – slightly deviated, 1 – markedly deviated. Muscle shortening (elasticity versus tightness) was assessed using the standard muscle length tests. Maximal isometric muscle strength was measured with manual dynamometer. The data was processed using the statistical package SPSS version 17.0.

RESULTS: The most frequently detected postural deviations were as follows: neck forward, chin out (49.3% of all children) and shoulders forward (43.3% of all children). There was much less muscle shortening among children, respectively: trapezius, upper part - 13.4%, pectoralis minor - 6%, neck extensors - 1.5%, pectoralis major lower part – 1.5%. The children divided into two groups according to the results of posture assessment: normal posture (NP) and deviated posture (DP). Comparing the force ratios of postural groups, it could be noticed that there are no statistically significant differences (\(p > 0.05\)) between NP and DP in neck flexors and extensors ratio, also in pectoralis major lower part and trapezius lower part ratio. But there is statistically significant difference (\(p \leq 0.01\)) between NP and DP groups in pectoralis major upper part and trapezius middle part force ratio on right side, testing the right upper limb; and there is no significant difference (\(p > 0.05\)) in same ratio between groups on left side, testing the left upper limb.

CONCLUSIONS: On almost half of the children the features of upper crossed syndrome can be identified, but obvious syndrome can be found only in a small number of physically active 9 - 14 year old children.
MUSCLE TONE IN LOW BACK PAIN: CHANGES AFTER THERAPEUTICAL EXERCISES

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PURPOSE: An impairment of balance of trunk muscle’s strength might be risk factor for low back pain (LBP) and reason for changes in lumbar lordotic curve shape in athletes. The aim of the study was to compare characteristics of muscle tone before and after one month of therapeutical exercise program (TEP) in patient with idiopathic LBP.

METHODS: Young woman aged 21 year, a track-and-field athlete of republic level participated in present study. Period of sports activity was 16 years, training load was 5 times a week and averaged by 8 hours per week. Athlete had idiopathic LBP during six months. Subjective pain intensity was assessed by visual analogue score (VAS). Characteristics of skeletal muscles’ tone were measured by hand held myometer Myoton-3 and software (Müomeetria Ltd, Estonia) by the method of damped oscillations. MultiScan mode (5 times in one point of muscle, kick time 15 ms) was applied and mean data was accept for analysis. Following characteristics were compared before and after TEP: muscle oscillation frequency (Hz) (characterising tone of muscle at relaxation), logarithmic decrement of oscillations damping (characterising muscle elasticity), stiffness (N/m) (characterising muscle's ability to resist the changes of its shape caused by external force). Next muscles were studied bilaterally in lying, relaxed condition: Tibialis anterior (TA), Gastrocnemius medial head (GM), Rectus femoris (RF), Biceps femoris (BF), Gluteus medius (GLmed), Trapezius upper part (TrU) and middle part (TrM), Erector spinae (ErSp).

RESULTS: Pain intensity (VAS scores) significantly decreased after TEP. Tone of right TA was significantly higher (p < 0.05) (both tests). Changes of GM characteristics had different tendencies for right and left body side. Tone and stiffness of RF were increased and elasticity worsened (decrement increased) as compared to pre-TEP (p < 0.05). Stiffness of BF decreased as compared to pre-TEP. In TrU tone, stiffness and elasticity characteristics were higher for the right side in both measurements. Athlete had an increase of stiffness in TrM for both body sides and decrease of tone as compared to pre-TEP. Significant worsening of elasticity and increase of stiffness in ErSp for both body sides were noted. Increase of tone and stiffness of GLmed and GLmax was found as compared to pre-TEP. Future improvement of the next muscles’ condition was recommended: GM (left), TrU (right), and bilaterally in RF, BF, TrM, ErSp.

CONCLUSIONS: After one-month TEP, changes in muscle tone characteristics in thigh and trunk muscles were noted. It has been suggested that in case of LBP asymmetric contraction of trunk muscles, as well as of antagonistic thigh muscles took place.
SHOULDER FUNCTION IN PATIENTS WITH FROZEN SHOULDER SYNDROME

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PURPOSE: The purpose of this study was to evaluate the changes in shoulder function in patients with frozen shoulder syndrome (FSS) after manipulation under general anesthesia (MUA).

METHODS: Seventeen patients (nine women, eight men, median age 52 years) with the diagnosis of FSS who were divided into two groups (subjects whose active range of motion (ROM) during flexion (FL) was below 100 deg (group FL90) and above 100 deg (group FL100)) participated in this study. Shoulder function measured by ROM during FL, external rotation (EXR), isometric maximal voluntary contraction (MVC) force during FL, EXR, and shoulder muscle endurance time were measured before, one and six months after MUA. Patients were also screened by a self-administered shoulder rating questionnaire (SRQ).

RESULTS: Before MUA in the FL90 and FL100 groups, ROM during FL and MVC force during FL, and EXR for the involved extremity were lower (p < 0.05) as compared with the uninvolved extremity, whereas the endurance time was lower (p < 0.05) in the FL90 group. One month after MUA ROM during FL, MVC force during FL, EXR, and the endurance time for the involved extremity remained lower (p < 0.05) in the FL90 group as compared with the uninvolved extremity, whereas the endurance time remained lower (p < 0.05) also six months after MUA. SRQ scores improved (p < 0.05) in both groups in all measured points.

CONCLUSIONS: This study demonstrated improvement in shoulder function after MUA in patients with FSS, whereas patients whose ROM during FL was lower needed more attention during the recovery period for achieving better shoulder function.
IS ELITE ATHLETES’ BACK PAIN AND INJURY SPORT TYPE SPECIFIC?

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PURPOSE: The prevalence of back pain is increasing in the athletic population. However, there is a lack of evidence that it is related to particular type of sport activities, training or demographic factors for elite athletes. Three aims of this study were: 1. to investigate whether elite athletes’ back pain and injury is specifically sport type related; 2. to exam if back pain and injury of athlete is related to experience, age and gender; 3. to distinguish relative higher and lower risk of back pain/injury related to sport types.

METHODS: 335 elite athlete (269 Taiwanese; 121 ♂, 148 ♀, age 23.2 ± 6.9 y; 66 German; 32 ♂, 34 ♀, age 26.0 ± 7.6 y) participated in the study. Inclusion criteria were: current or retired national team members of Olympic sports. The risk of injury questionnaire (Risk-IQ) for elite athlete was employed. Two adapted sport categories (1. format, 2. location) were introduced for sport type categorization. Back pain and injury records were also analyzed with 2 categorization systems. Descriptive statistics and independent sample T-tests were used for mean-score comparison; Mann-Whitney U test (2 groups), Kruskal-Wallis test (k groups) and Spearman correlation coefficients, were employed for between groups’ comparisons. Significance level p < 0.05.

RESULTS: Significant difference of back pain/injury frequency found on factors of „age groups“ (p < 0.05) (correlation coefficient r = 0.26, p < 0.01) and international sport participation „experience levels“ (p < 0.05) (correlation coefficient r = 0.22, p < 0.01) . No significant difference on „gender“. Sport format: “Team-Combat” (3.36 ± 4.1, n = 14) significantly higher than “Team-No Contact” (1.65 ± 3.2, n = 51) (p < 0.05). Sport location: “On-Ice” (5.40 ± 7.6, n = 20) significantly (5-folds) higher than “On-Water” (1.00 ± 1.8, n = 33) (p < 0.01). Top-5 sport types with higher back pain rates in this study were: Rugby, Ice Hockey, Pole Vault, Wrestling, and Bob Sleigh. Bottom-5 sports were: Swimming, Sailing, Marathon, Shooting, and Equestrian.

CONCLUSIONS: Back pain and injury are sport type specific. Combat sport in team formation portrayed highest risk relatively to non-contact sports. Sports perform on ice indicated highest risk relatively to sports on water with lowest risk of back pain/injury rates. The greater the age and experience levels, the greater the mean back pain/injury incident rates. Further investigations on the potential causes of difference are needed for better understanding.
GENETIC TESTING IN ATHLETES: THE HYPE CONFRONTED WITH A COMPLEX REALITY

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**PURPOSE:** Over the course of the last 15 years, technical progress enabled genome-wide DNA analysis to discover associations between the genome and complex phenotypical traits and diseases. Also within the field of sports sciences genetic variations were studied to determine genotype phenotype associations in relation to performance associated traits. Recently, a growing number of direct-to-consumer genetic tests are offered by several companies to provide information about sports performance, trainability, exercise capacity or risk of injury. Here, we will discuss the most recent progress as well as common pitfalls and limitations of genome analysis, to shed light on the current significance and the potential of genetic testing in sports.

**METHODS:** A comprehensive literature analysis was conducted to summarize the current progress of molecular biological research for the prediction of phenotypical traits by means of SNP analysis, within the fields of medicine and sports science. Main focus was on studies that can serve as best practice examples to assess the predictive power of genetic analysis.

**RESULTS:** In contrast to deterministic genetic tests for the detection of fully penetrant monogenetic diseases, the genetic prediction for complex phenotypical traits is probabilistic. Recently published reports from genome wide association studies (GWAS) including hundreds of thousands samples revealed that the phenotypic variation and onset of diseases that can be explained by analyzing common single nucleotide polymorphisms (SNPs) is very limited. This is related to typically small effect sizes, unrecognized effects of rare variants, unknown pleiotropic effects and interactions of non-coding RNAs. Despite considerable efforts to link genetic variants and performance related traits within the field of sports sciences, a limited number of validated genes with small effects were detected.

**CONCLUSIONS:** The translation of results from genetic tests for the prediction of exercise performance traits is currently not realistic and lacks a meaningful predictive power that would justify its practical implementation. According to the typically small effects of a large number of genetic loci and unknown pleiotropic interactions the distinct prediction of performance capacity is hampered or impossible. Further research is needed to determine whether screening for genetic risk variants with moderate or high effect sizes can be used for corroborating the risk for exercise related diseases or can be used for classical diagnostics in sports medicine.
The study of athletes’ morbidity according to addressability for medical assistance is a basic method to study the health status by its informative nature and possibility to develop specific primary prevention measures for premorbid and morbidity states. The actual situation regarding the level and structure of athletes’ morbidity is very difficult to be estimated because most of athletes are addressing more frequently to territorial healthcare institutions.

PURPOSE: Evaluation of young athletes’ specific morbidity from the sport lyceums of Chisinau municipality and elaboration of preventive measures.

METHODS: It was carried out the retrospective analysis of general morbidity of athletes during the last 10 years (2005 - 2014) according to addressability for medical assistance. The analysis was carried out using traditional statistical methods.

RESULTS: The overall level of athletes’ morbidity from sport lyceum after addressability makes up 1003.6 ± 96.87‰. In relation to the classes of diseases, the highest level is characteristic for respiratory diseases (624.0 ± 55.33‰) and injuries (132.4 ± 15.84‰). The rest follows skin diseases (107.4 ± 19.4‰), osteoarticular system diseases (30.1 ± 3.23‰) and eye and its annexes disorders (23.5 ± 3.35‰). The structure of general morbidity of young athletes shows a fairly high rate of respiratory system diseases (62.18%), injuries (13.2%) and skin diseases (10.71%). These three groups of diseases spread among athletes represent 86.1% out of all registered diseases through addressability confirms the need to develop specific preventive measures for remediation of environmental conditions and strengthening the health status of young athletes. The structure of morbidity by injures is predominated by superficial injuries (34.5%), dislocations, sprains, ligament strains (61.7%) and fractures (3.8%).

CONCLUSIONS: There were established a high level of incidence of respiratory systems diseases, injuries and skin diseases. In the structure of morbidity these three groups of diseases represents 86.1% of all registered diseases. Taking into consideration the results of current research and spread of morbidity among young athletes we developed a set of preventive measures.
CHARACTERISTIC OF FUNCTIONAL CHANGES OF ATHLETES’ ORGANISM
PRACTICING WRESTLING

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The activity of athletes practicing wrestling is manifested by performing acyclic different intensity exercises. The fights forward to increased requirements observation, alertness, and ability to quickly take the right decisions, to "mitigate" the advantages opponent.

PURPOSE: Assessment of physiological changes of young athletes’ organism practicing freestyle and Greco-Roman wrestling in the process of physical training.

METHODS: To assess the functional status of the athletes’ organism were investigated physiological indices of cardiovascular system, central nervous system, neuromuscular and respiratory systems, before and after training, on a representative sample of 61 males, aged 16 - 17 years old. For each person were determined physiological indices and were calculated integral indices.

RESULTS: The functional changes depend on the state of health, degree of tension, and the physical condition of the athlete sports experience, training methods and not least of all the training conditions. These changes are characterized by the cardiovascular system by increasing the heart rate (HR) from 90.7 ± 2.76 up to 126.0 ± 5.1 beat/min, systolic blood pressure (SBP) increased from 131.0 ± 2.04 up to 147.0±1.15 mm/Hg, for diastolic blood pressure (DBP) from 83.2 ± 1.81 to 90.9 ± 2.22 mm/Hg, for mean arterial pressure (MDP) from 107.0 ± 1.27 up to 113.0 ± 1.09 mm/Hg, for systolic volume (SV) from 65.9 ± 2.35 up to 71.8 ± 2.7, cardiac output up from 5979.0 ± 305.2 l to 9137.3 ± 565.0 l and decreasing of initial peripheral vascular resistance (PVSR) from 1473.0 ± 80.67 until 1057.2 ± 58.12. Changes in the central nervous system manifested by extending in the visual latent period from 128.30 ± 4.08 up to 160.0 ± 8.93 ms, the hearing latent period up from 175.1 ± 11.2 to 201.4 ± 15 ms. As for neuromuscular system the muscle force decreased from 64.9 ± 1.76 until 58.1 ± 1.48 kg and muscle resistance decreased from 6.86 ± 0.67 to 4.29 ± 0.4 s. The respiratory system was an insignificant decrease in vital capacity of lungs from 4.6 ± 0.13 to 4.13 ± 0.13 l.

CONCLUSIONS: Freestyle and Greco-Roman wrestling produces functional changes in all organs and body systems. Thus, the cardiovascular system after training HR increases per 38.9%, RTV increased to 24.7% and visual latent period to 14.8%. There was a high request of neuromuscular system, manifested by decreased muscle resistant by 59.9% and 11.7% decrease in muscle strength after physical training.
PURPOSE: Objective measurement of muscle tone or state of tension and biomechanical properties, such as elasticity and stiffness greatly enhance detection of injury risks and monitoring the effects of intervention, such as training or treatment. Important data can be collected from the individual muscle tone and viscous-elastic properties to build up a well-structured and versatile training system. The aim of this study was to estimate the differences of muscle tone and biomechanical properties of lower extremity muscle.

METHODS: Twenty-nine male and 28 female endurance trained athletes (ETA, n = 18), power trained athletes (PTA, n = 19) and untrained (UT, n = 19) subjects at age of (mean ± SE) 22.8 ± 1.1 years participated in the study. The frequency (Hz) of mechanical oscillation of the muscle tissue (indicating the tension in the muscle), logarithmic decrement of the oscillations damping (indicating the elasticity of the muscle) and stiffness (N/m) of the muscle tissue were registered bilaterally at rest using myotonometer Myoton 3 (Multiscan mode) and Myoton® software. The tone characteristics of studied muscles - tibialis anterior (TA), peroneus longus (PL), gastrocnemius medial head (GM) and lateral head (GL), rectus femoris (RF), biceps femoris (BF) was measured in symmetrical points five times in right and left side.

RESULTS: There were no significant differences in muscle tone characteristics between right and left body sides in calf muscles, but higher tone values (p < 0.05) were noted in PL in PTA males compared to ETA males and in ETA females compared to UT females. Significant difference (p < 0.05) was found in GL muscle tone characteristics in ETA and PTA males, higher in right side and lower in left side, respectively. No differences in tone characteristics of thigh muscles between right and left body side were noted in studied groups. Tone characteristics of BF muscle in UT males and females were significantly lower compared to ETA males and females. Significantly lower (p < 0.05) tone characteristics of RF muscle were noted in UT females in comparison to ETA females.

CONCLUSIONS: It is crucial to have an adequate feedback of the neuromuscular function. Primary monitoring and assessing of muscle tone and biomechanical properties allow practitioners to prevent impairment of neuromuscular condition in athletes as well as in untrained subjects.

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TWO-MONTH PHYSIOTHERAPY INTERVENTION IMPROVES GAIT SPEED AND DYNAMIC BALANCE IN PATIENTS WITH PARKINSON DISEASE

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PURPOSE: Aim of the study was to examine the effect of 2-month physiotherapy intervention regimen on gait speed and dynamic balance in persons with Parkinson disease (PD).

METHODS: Twenty patients with mild to moderate PD (mean ± SD age of 71.1 ± 4.6 years, disease duration of 9.3 ± 6.2 years) participated during 8 consecutive weeks twice a week in physical therapy sessions, lasting 1-hour at a time. Intervention addressed posture, mobility, balance, gait and other transfers, as recommended in KNGF Guideline (2004). Patients were tested before and one week after therapy. Assessments included 10-m walk test on self-selected and fast speed and both 4 Square Test (4ST) and Timed-up-and-go test (TUG) were used to estimate dynamic balance of the participants. Movement Disorders Society Unified Parkinson’s Disease Rating Scale (MDS-UPDRS) was used for neurological assessment.

RESULTS: Gait speed (both self-selected and fast) increased (p < 0.05) after physiotherapy. At post-intervention, the 4ST time was shorter (8.64 ± 1.13 s) compared with pre-intervention (10.09 ± 3.00 s; p<0.05). The duration of TUG test time did not change significantly, but calculated walking speed on TUG test increased, more evidently when turning around over left shoulder (0.56 ± 0.14 m/s at baseline vs 0.80 ± 0.16 m/s post-therapy, p < 0.001). Walking speed on TUG test over right shoulder was 0.75 ± 0.20 m/s at baseline and 0.82 ± 0.16 m/s after intervention, respectively (p < 0.05). MDS-UPDRS total score remained unchanged, however, an improvement in motor aspects (items 3.9 - 3.14) and non-motor aspects of experiences of daily living (part IA) were apparent following therapy (p < 0.01).

CONCLUSIONS: Two-month physiotherapy intervention increased gait speed and improved performance on functional performance tests reflecting dynamic balance. The results indicate that it is useful to assess TUG performance over both shoulders and to calculate walking speed.
IX INTERNATIONAL BALTIC SPORTS MEDICINE CONFERENCE
(POSTER PRESENTATIONS)
CENTRAL AND PERIPHERAL FATIGUE IN MEN WITH HYPOGONADISM DURING 1-MIN MVC

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PURPOSE: The purpose of this study was to assess central and peripheral fatigue in men with hypogonadism during continuous 1-min maximal voluntary contractions (MVC) and after recovery of the quadriceps muscle.

METHODS: The men studied had a hypogonadism (n = 12), were between 21 – 32 y old and had single morning serum T levels at screening of 10.4 nmol/L (300 ng/dL) or less. The protocol of the procedure was followed at the same time of the day (8:00 am). The testing procedure: the force-generating capacity of the quadriceps muscle was assessed by applying 1 s trains of electrical stimuli at 1, 20, 100 Hz respectively. After a 5 min rest, three 5 s maximal voluntary contraction torque (MVC), a 250 ms test train of stimuli at 100 Hz (TT-100 Hz) was superimposed on the voluntary contraction. The same TT-100 Hz contractions were used to assess the voluntary activation of knee extensors. A 5 min rest period was allowed after the third MVC, and each subject performed 1 min MVC of the knee extensors at an angle of 60 flexion degrees. The TT-100 Hz was superimposed on the contraction at approximately 3, 29, 59 s. At approximately 30, 60 s, the knee extensors were relaxed for 2 - 3 s and TT-100 Hz was delivered as after the brief MVCs in the first part of the experiment. Then after 1 min rest was measured quadriceps muscle torques evoked by electrical stimuli at 1, 20 and 100 Hz, and then after a 5 min rest, three 5 s MVC. During the experiment before and after 1 min MVC were measured electrically-induced torque, MVC and voluntary activation (VA).

RESULTS: Data on electrically induced muscle performance, maximal isometric voluntary contraction before and after continuous 1 min MVC of knee extensors decreased (p > 0.05) or voluntary activation (VA) increased from 90.9 ± 3.9 % to 92.3 ± 2.3 % but no significant difference (p > 0.05). During the continuos 1 min MVC, the electrically induced torque (TT-100 Hz), MVC and voluntary activation (VA) index decreased significantly (p < 0.05) compared with ~3 s. Three-way ANOVA showed that the effects “time“ (changes during 1min MVC) on peripheral (changes TT-100 Hz) and central (changes in VA) fatigue were significant (p < 0.0001).

CONCLUSIONS: 1 min of maximal voluntary contraction resulted in central and peripheral fatigue definition with decreasing voluntary activation, maximal voluntary contraction force and the electrically induced torque in men with hypogonadism. After recovery central and peripheral fatigue disappeared.
MODERN INDICATORS FOR THE MEDICAL AND PEDAGOGICAL CONTROL THE STATE OF THE BODY DURING PHYSICAL TRAINING (FITNESS)

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PURPOSE: to determine the level of indicators of physical development and physical preparedness of modern children and youth 7 - 20 years involved in the process of physical training (fitness) for the control the state of organism.

METHODS: A total of 3877 pupils and students of Brest (boys (B) - 1684, girls (G) - 2193) at the age of 7 - 20 years were examined. Anthropometry (weight and body length, chest circumference), kaliperometriya (thickness of skinfolds (TSF) on 6 local areas), tests of physical preparedness (some from the Eurofit – the strength of the brush, indicators of balance, flexibility and speed hand movement). Statistical analysis of the results was performed, the significant differences between the results were determined using the Student t-test.

RESULTS: The age dynamic of average values of the indicators of weight and body length, chest circumference in studied population was received. Significant differences between the indices of B and G were typical for ages 14 - 20 years (p < 0.05). The means of values of the indices of physical development (BMI, weight and growth index (Quetelet 1), life index, strength index) were calculated. There were marked a significant differences between the values of the indices to B and G at the age of 10, 12 and 13 - 20 years (p < 0.05). The topography of TSF distribution in aspect of age was received. This is important because in recent years the number of children and young people with high BMI and obesity was increased. Values of TSF allow operatively to carry out monitoring of the level of fat in the process of physical training (fitness), build a training program, adjust the degree and duration of the load. Significant differences were noted between the B and G in the 10 - 12, 14 - 20 years (p < 0.05). Since 13 years in the B group unlike G was detected tendency to reduce the magnitude of indicators. There were determined the mean values and the significant differences between the groups B and G in indicators of physical preparedness. We marked the differences between groups B and G according to various indicators (p < 0.05). The most dynamically changeable parameters were found: in group B - flexibility and strength of the brush and in group G - balance and strength of the brush.

CONCLUSIONS: The results are the modern database for prompt the medical and pedagogical control the state of the body of children and youth of the western region of Belarus (Brest) in the process of physical training (fitness).
INJURY FREQUENCY AND RISK FACTORS ON ATHLETES: THE INFLUENCE OF MEDICAL CARE TIMING AND LOCATION

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PURPOSE: Timing and location of medical care support (MCS) is crucial to elite athletes for receiving proper injury treatment and preventing recurrent injury. The aims of this study were to exam: 1. if results of MCS survey were influenced by athletes’ demographic and risk related factors (i.e. Periodical Health Examination-PHE and Preparticipation Evaluation-PPE status); 2. If injury frequencies were influenced by timing and location settings of MCS.

METHODS: 335 elite athletes (269 Taiwanese; 121♀, 148♂, age 23.2 ± 6.9 y; 66 German; 32♀, 34♂, age 26.0 ± 7.6 y) participated in the study. Inclusion criteria were: current or retired national team members of Olympic sports. The risk of injury questionnaire (Risk-IQ) for elite athletes was employed. Demographic and risk related factors and injury frequency of 10 body parts were tested with 3 categories of variables: in Training (MCS-Train), in Competition (MCS-Comp) and total amount received (MCS-Total). Data were analyzed descriptively (mean ± SD), Mann-Whitney U test (2 groups), Kruskal-Wallis test (k groups) and Spearman correlation coefficients were employed. Significance level was set to p < 0.05.

RESULTS: Significant differences found: MCS-Total on age (p < 0.01), novice status (p < 0.01), sport type (p < 0.01), PHE and PPE status (p < 0.01). Also found in MCS-Train on nationality (p < 0.01), prescribed medication (p < 0.05). All 3 variables significantly correlate with athletes’ international competition experiences: MCS-Total (r = 0.27), MCS-Train (r = 0.28), MCS-Comp (r = 0.24), for all p < 0.05. Significant correlation found between MCS total and injury frequencies of whole body sum (r = 0.22), back (r = 0.16), shoulder (r = 0.21), elbow (r = 0.16) and hip (r = 0.17), for all p < 0.01. So did MCS-Train with: head (r = 0.14, p < 0.05) and knee (r = 0.13, p < 0.05).

CONCLUSIONS: The total amount of MCS received showed significant difference on age, sport type, novice and PHE/PPE status. No significant differences on gender, career status, smoking/alcohol drinking status and doctor’s restriction were found. MCS received during training significantly influenced by nationality and prescribed medication status. Athletes’ international competition experience level was a significant correlated factor with all 3 MCS categories. Injuries of back, shoulder, elbow and hip as well as whole-body sum correlated significantly with total amount MCS received. Head and knee injuries correlated with MSC received in training. Low significant correlation values were found in this study.
Physiotherapists are the largest group of rehabilitation specialists in Latvia and it is still not examined the extent to which Latvian physiotherapists carry out the promotion of an active lifestyle in their daily practice.

**PURPOSE:** To explore the potential for physiotherapist’s knowledge, attitude towards the promotion of an active lifestyle and to what extent an active lifestyle promotion programs for disease prevention physiotherapists integrate into patient care.

**METHODS:** The study included 243 participants (55% of the physiotherapists working in Latvia) - practicing physiotherapists with at least half a year of work experience. To obtain information questionnaire “Physical activities in the physiotherapists practice” in Latvian was used. Practicing physiotherapists via e-mail (using the Latvian physiotherapy association's address book) have received an invitation to participate in the study with on-line link to complete the questionnaire electronically.

**RESULTS:** The results show that the majority of physiotherapists were aware of their active lifestyle facilitator role (77.8%) and in advising patients often or very often integrate active lifestyle recommendations (72.0%). Most respondents (77.8%) agreed with the statement that physiotherapists should be physically active in order to provide an example to their patients and was found a statistically significant relationship between length of working experience and the degree of agreement with this statement ($\chi^2 = 6.59$ and $p = 0.038$). Respondents as a barrier to an active life-style promotion called a lack of interest, lack of time and belief that patients will not change their habits.

**CONCLUSIONS:** The surveyed physiotherapists in Latvia have a positive attitude towards the promotion of an active lifestyle and the majority are aware of their active lifestyle facilitator role. In most cases, specialists in their consultations integrate an active lifestyle recommendations and a brief guidance and mentoring. Participants with longer work experience agreed that physiotherapist must be physically active, and should be an example for their patients, more than less experienced colleagues. Respondents most frequently pointed out that the obstacle to the promotion of an active lifestyle is the belief that patients will not change their habits. However, respondents physiotherapists have insufficient knowledge of the physical activity recommendations developed by WHO.
**PURPOSE:** To assess micronutrient intakes in prepubescent ballet dancers. Proper nutrition, not simply adequate energetic intake, is needed to achieve optimal dance performance. The micronutrients that should receive more concern in dancer’s diet are iron and calcium. Regarding iron, dancers and other athletes engaged in impact sports must compensate for the high rate of hemolysis. Adequate calcium intake (and absorption) reduces the risk of developing osteoporosis, which is alarmingly common in dancers and can hinder a promising career.

**METHODS:** Thirty-nine female ballet dancers (age 12-14 years) and seventy female respondents from ordinary school as controls (age 13-15 years) were selected to participate in the study. All ballet dancers were from Riga choreography school who had been actively training for at least 3 years (mean ± SD; 5.8 ± 2.4 years), training volume at the time of the study was 24.4 ± 3.4 h/week. Controls reported no history of participation in competitive sports. Dietary intakes were assessed using 3-day food record questionnaire, completed by interviewer asking about the food eaten in previous day and using pictures series for the estimation of the portion sizes consumed. Dietary intakes were assessed over two non-consecutive weekdays and one weekend day.

**RESULTS:** In winter period both ballet dancers and girls from control group have nutritional deficiency. There is micronutrient deficiency (under the recommended values): 100% potassium in both groups; 97.6% (CI 92.5 - 102.4) calcium in ballet dancers and 98.6% (CI 95.8 - 101.3) in controls; and magnesium 94.9% (CI 87.9 - 101.8) and 95.7% (CI 90.7 - 100.4) accordingly. Mean intake of iron is lower in ballet dancers (8.1 ± 2.5 mg vs. 9.9 ± 2.2 mg, p < 0.001), but deficiency is 64.1% (CI 49.0 - 79.2) in ballet dancers and 97.1% (CI 93.2 - 101.4) in controls. Both groups have vitamin E (100% vs. 77.1%), vitamin A (89.7% vs. 75.7), vitamin B2 (89.7% vs. 80.0%), and vitamin B6 (97.4% vs. 77.1%) under the recommended values.

**CONCLUSIONS:** There is a great nutritional deficiency in ballet dancers as well as in controls in winter period and need to educate young girls to meet their nutritional needs.
ADOLESCENT SPORTS INJURIES IN SPORTS CLUBS, SCHOOL SPORTS AND OTHER LEISURE-TIME PHYSICAL ACTIVITIES

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PURPOSE: Adolescents are encouraged to participate in sports and other leisure time physical activities (PA) because of the positive effects of exercise on physical and mental health. However, participation in PA also carries a risk of injury. The aim of this study was to investigate adolescent sports injuries in sports club, school sports, and other leisure time PA.

METHODS: This study is part of the Finnish nationwide Adolescent Health and Lifestyle Survey (AHLS). In this study, we combined data from 2009 and 2013. In each study year, a nationally representative sample of 12-, 14-, 16-, and 18 year old Finns was obtained from the Population Register Centre. A structured questionnaire, which included questions about PA participation, and sports injuries that had occurred in different PA settings during the past 12 months, was mailed in February of both study years. Up to three follow-up enquiries were sent to non-respondents. In 2009, the sample included 9920 adolescents, and 5516 responded. In 2013, the sample included 9398 adolescents, and 3535 responded. For the combined data for 2009 and 2013, the response rate was 50%.

RESULTS: Out of the subjects who reported participating in some physical activity, 29.9% had suffered at least one sports injury in the past 12 months. The injury rate in sports club activities was 24.8% for boys and 20.7% for girls. In school sports activities, the injury rate was 9.8% for boys and 10.0% for girls. In other leisure time PA, the injury rate was 17.6% for boys and 13.3% for girls. The injury rate in sports club activities was significantly higher than the injury rates in school sports and other leisure time PA for boys and girls (\(p < 0.001\)). The rate of other leisure time sports injuries was higher than the rate of school sports injuries for boys and girls (\(p < 0.001\)). Age was associated with the sports club injury rate; the injury rates were highest in the 16- and 18-year-olds among boys and in the 14-year-olds among girls. In the school sports and other leisure time injuries, the injury rates were lower in the older age groups (\(p < 0.001\)).

CONCLUSIONS: Out of the three PA settings, injury rates were highest in sports club activities. Participating in instructed activities in sports clubs does not seem to provide adolescents with the skills or knowledge needed to prevent sports injuries. There is a need to introduce further preventative measures to reduce the risks of injury in different settings.
ASSESSMENT OF EARLY CHARACTERISTICS OF MUSCULOSKELETAL SYMPTOMS FOR MILITARY PERSONNEL

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PURPOSE: We assess musculoskeletal symptoms (pain) for military personnel – cadets of National Defence Academy, that could be one of early characteristic for developing musculoskeletal pathology.

METHODS: We have provided a Standardized Nordic Questionnaire for Analysis Musculoskeletal Symptoms for respondents (n = 147) in period 2013 - 2015. The 1st group includes 117 in aged 19 - 21 year, that spent in Armed Forces about 6 - 18 months, the 2nd group includes 41 cadets in aged 24 - 26 years who has military service time about 60 - 75 months. We provide analysis of questionnaire data.

RESULTS: Military service quality depends on military personnel health, which is determined by both personal and occupational risk factors at the service place. Intense and frequent training, over an extended period, with insufficient rest/recovery time, may result in exercise-induced tissue trauma in military environment that may evoke a chronic, systemic inflammatory response. The military personal have passed through various check-up control stages: the health capacity evaluation according the regulation; physical exercise tests. The high physical load and the intensive training process is compulsory part of the studies in National Defence Academy. We fixed the musculoskeletal symptoms at early stage by using standardized questionnaire. We have evaluated questionnaire data for 1st year cadets and 4th years cadets groups of respondents. There are more than 75 - 80% of respondents in the 1st group (n = 37, 2013) have musculoskeletal troubles during the 1st study year. The principal problem was pain in the low back (40 - 60%). The second expressed musculoskeletal symptom region was knees region (27 - 37%). The assessment of the questionnaire data of the 2nd group of cadets (n = 33, 2014) revealed that skeletomuscular pain symptoms pointed 75 - 88% of respondents. The mainly problem region was the lower back (52.9%), then follow the problem group of knee region (58.8%) and the next was shoulder region (47.1%).

CONCLUSIONS: The military service is connected with the high physical load, therefore early revealing and fixing the musculoskeletal problem at early stage allow reduce risk of chronic disorder. The nature of these problems suggests that a combination of ergonomic and individual/organizational, intrinsic and extrinsic factors associated to military environment, psychosocial factors.
PURPOSE: The aim of this study was to examine binge eating and caloric intake in relation to positive and negative emotions in normal weight women. This study examined overall tendency to feel positive and negative emotions and also situation based (filled up in food diaries) emotions in relation to eating and caloric intake.

METHODS: Adults filled three consecutive days eating diaries, where they noted food intake and emotions. After eating it was asked to assess whether it was a binge eating or did participants have an urge to binge eat. Participants were divided into two groups: people with disturbed eating behavior (n = 57) and people without disturbed eating behavior (n = 29).

RESULTS: Results showed, that tendency to feel negative emotions was related to disturbed eating behavior. Also, binge eating and urge to binge eat were related to negative emotions felt after binge eating. People with disturbed eating behavior compared to people without disturbed eating behavior ate on average more carbohydrates, fats and proteins.

CONCLUSIONS: For both, people with and without disturbed eating behavior, the higher the tendency to feel positive emotions, the less carbohydrates they ate on average. For people with disturbed eating behavior, the higher the tendency to feel positive emotions the less calories they ate on average day.
ACE I/D and ACTN3 R577X polymorphisms are the most extensively studied genes in recent years in association with human physical performance. VO\textsubscript{2max} is recognized as one of the major quantitative traits in sports physiology and the most common method to demonstrate cardiorespiratory endurance. The heritability for the VO\textsubscript{2max} in several studies has been observed up to 51%.

**PURPOSE:** (1) To assess ACE gene ACTN3 genotype frequencies in young male skiers compared to the control group and (2) to analyze the relationships between VO\textsubscript{2peak} and ACE I/D and ACTN3 R577X polymorphisms in young male skiers.

**METHODS:** Male skiers (n = 56; 14 to 21 yrs), 52% of them are current or former junior national team members of Estonia. A standardized exercise test on a treadmill with determination VO\textsubscript{2peak} was performed. Anthropometric measurements and training characteristics were obtained. The male control group (n = 145, 20 to 37 yrs) consisted of healthy sedentary subjects without previous athletic status. Venous blood samples for DNA extraction were collected. Genotyping of rs4343 (ACE, C\_11942562\_20) and rs1815739 (ACTN3, C\_590093\_1) was carried out by using the TaqMan SNP 5’ allelic discrimination assay. For statistical analysis, descriptive analysis, \(\chi^2\)-test was used.

**RESULTS:** Frequency of ACE ID and ACTN3 RR genotypes in male skiers was statistically higher (p < 0.05) and frequency of RX genotype of ACTN3 was lower (p < 0.05) compared with controls. There were no significant differences in distribution of ACE I/D and ACTN3 R577X polymorphisms between the groups with different competing levels. We did not observe significant differences in mean VO\textsubscript{2peak} between ACE I/D, as well between ACTN3 R577X genotypes in male skiers.

**CONCLUSIONS:** Our study results revealed a statistically higher prevalence of ACE ID and ACTN3 RR genotypes in young male skiers (64% and 40%, respectively) compared with male controls (47% and 18%, respectively). No significant relationship was found between VO\textsubscript{2peak} and ACE I/D as well between ACTN3 R577X genotypes in male young skiers.
EFFECT OF 24 WEEKS STRENGTH TRAINING ON BALANCE CAPABILITY OF GROWING FEMALE DANCERS.

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PURPOSE: To assess the response in two different field balance tests, one static requiring hip mobility (SEBT) and one static and walking (USTB), to a strengthening protocols aimed at core strengthening and peripheral strengthening on a population of young female dancers.

METHODS: 21 female dancers aged 6 - 14 years took part in the study. Mean age 9.6 ± 2.2 years, weight 38.3 ± 9.6 kg, height 140.4 ± 16.20 cm, sitting height 74.5 ± 7.8 cm, lower limb length 66.1 ± 8.4 cm. Subjects underwent a 24 weeks, twice per week, 1 hour ankles, legs and abdominals muscles strength training. The protocol consisted in crunches exercises, ankle exercises, hops and jumps as previously described. Subjects were tested in the pre and post training conditions with the static balance star excursion test (SEBT) and the US naval test battery (USTB), in a random order. Pre-post T test for paired samples was performed with the software SPSS v.21.

RESULTS: The subjects shows an improvement between the pre and post test conditions both in the SEBT test (mean 2.3 cm, 2.1 - 2.7 cm range) than in the static USTB test, while showed a worsening in the USTB walking test (mean 5 s, mean 1 - 15) (Student T -7.17/-8.01 p < 0.001). Any correlation was found between the results of the two test batteries.

CONCLUSIONS: We found the strengthening of core and ankle muscles to be effective in improving static balance in growing female dancers; we observed a significant improvement in both tests after a 24 week, 2 hours per week of training of abdominals, legs and ankles muscle groups. The SEBT and USTB tests showed to be totally independent each other in assessing body balance; any correlations between the tests results were found. This can be explained with the requirements of the two tests and with the involvement of hip mobility in the SEBT. Walking balance require specific training and it is not influenced by strength training of core and lower limbs in young dancers. When assessing balance in young dancers, it is recommended to include a walking test, in order to have a complete profiling of balance capacities.
HOW TO EXPLAIN THE RESULTS OF EXERCISE TESTING TO NONMEDICAL PERSONS

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PURPOSE: Exercise testing is a commonly used procedure in sports medicine and in cardiological practice. Usually, physicians who conduct the testing, provide the patient with a medical description of the results. However, most patients have no medical knowledge to adequately understand the real meaning of this document.

METHODS: We have compiled specific information sheets which help, in a very simple form, the physician to explain all important indices and their meaning to each person. These sheets are: (1) The graphs of the dynamics of HR, Vo2,Co2 and RQ. The AerTh and AnaerTh are marked with the use of special vertical La scale stamp. (2) Separate evaluation graphs of VO2/ml/kg for men and women. (3) Printout of all physiological data. (4) A sheet with illustrative presentation of respiratory indices, heart indices and blood pressure indices. The blood pressure graph is supplied with a special reference graph of hypertension. (5) A written formal summary combining explanatory remarks with the colour graphs of the training zones and additional indices (2 pages). The whole explanation usually takes about 15 min and is well understandable to all nonmedical persons.
A RESEARCH OF AWARENESS OF DOPING USAGE AMONG TURKISH STUDENT ATHLETES (A SAMPLE OF IZMIR, TURKEY)

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PURPOSE: For thousands of years, humans have sought the use of medicines, herbs, and other chemicals to improve their lives in various ways. In recorded history, competitive athletes have used various mixtures of animal and plant origins, taken from known and unknown products, in attempts to improve their athletic performance and gain the perceived benefits of victory. Past and present athletes have been willing to take various chemicals, even without any proof of their benefit, in hopes of improving their general health or their sports performance. Survey is conducted for showing the alteration between academic levels in order to using doping. Results shows that academicians who have higher level are inclined to use doping rather than lower level academicians. The paper examines the scientific basis for doping using potential highlighting the academic level consideration that the relationship between doping behaviour alters due to the academic level.

METHODS: Data was collected from a convenience sample of (n = 126) students who are living in Izmir/Konak who self-completed a questionnaire surveys with key experts.

RESULTS: The majority of the sample were male (50%) with a mean age of 22.6 years (range 18–31 years); 77.9%. The majority (51.6%) participated in a team sport and 7.1% indicated that they used doping while the academic level is a parameter of altering.

CONCLUSION: The parameters according to survey estimates revealed that students who believe their academic level is low and who are doing sports were positively associated with the corresponding types of consolation for the using of doping. Future research may wish to investigate attitudes towards newer methods to analyse doping usage.
ASSESSMENT THE PROPORTION OF BODY FAT IN YOUNG ATHLETES USING REFERENCE VALUES

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PURPOSE: We set out to examine the proportion of body fat (\%BF) measured by bioimpedance analysis (BIA) in a representative cohort of Latvian children and adolescents participating in organized sports using reference values.

METHODS: The study population comprised 6048 young athletes (4249 boys and 1799 girls) aged 10 - 17 years from a representative mix of urban and rural areas and sports disciplines throughout Latvia. During the study period, 14475 measurements were taken (10019 on boys and 4456 on girls). The athletes represented 27 sports divided into three groups according to weight control practices: group I, weight-class sports in which short-term weight control practices are used; group II, aesthetic sports in which leanness is preferred; and group III, weight control is not highlighted. Body mass and total body fatness was measured using multifrequency, 8-polar, bioelectrical impedance leg-to-hand analyser or body composition analyser (X–Scan pluss II, Korea). \%BF was evaluated against reference values for young athletes.

RESULTS: Body fat (\%BF) very low level (under 20 percentile) was found 19.9\% (CI ± 0.77; 18.5 - 20.9\%) in boys and 18.8\% (CI ± 1.15; 16.6 - 19.9\%) in girls. Assessing according to sport groups, in aesthetic sports (II group) 25.6\% (CI ± 5.41; 20.2 - 31.0\%) male athletes and 32.6\% (CI ± 2.89; 29.7 - 35.5\%) female athletes has \%BF under 20 percentile. Remarkably high amount lean boys are in the III sport group – nearly 20\% in all age groups, more then in girls in the same sport group. \%BF under 20 percentile in boys is 7\% and less which are under the recommended level in all age groups.

CONCLUSION: Considering that adipose tissue is a vital endocrine organ for normal physical development in children, the findings suggest that there is an urgent need to assess body fat levels in these populations of children for primary prevention of effects on growth and medical complications.
CENTRAL AND PERIPHERAL FATIGUE PERFORMING INTERMITTENT QUADRICEPS MUSCLE CONTRACTIONS WITH LOCAL HEAD HEATING AND COOLING

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PURPOSE: The aim of this study was established and investigate the effect of local head heating and cooling on central and peripheral fatigue performing intermittent isometric contractions (IIC) with the quadriceps muscles by men.

METHODS: Control group (CON) n = 15, age 22.5 ± 3.7 yr, head heating group (HHT) n = 15, age 21.5 ± 2.7 yr and head cooling group (HCL) n = 15, age 23.0 ± 4.0 yr. The quadriceps muscle was assessed of electrical stimuli at 20, 100 Hz respectively. After a 2 min rest two 5 s MVCs were obtained. At ~ 3 s of MVC, a 250 ms test train of stimuli at 100 Hz (TT-100 Hz) was superimposed on the voluntary contraction. These TT-100 Hz contractions were used to assess the voluntary activation ratio (CAR) of knee extensors. The highest force that could be held for 3 s of the two MVCs was assessment to use for calculations of the submaximal targets force. All volunteers performed of 112 (5 s contraction and 20 s rest) of IIC at 50% of MVC force. Before the beginning protocol procedure HHT and HCL subjects 30 min resting in chair with head heating or cooling helmet. Knee extensor neuromuscular parameters function i.e. P20, P100, MVC and CAR were assessed four times: pre-ex, mid-ex, post-ex, an hour rest for IIC on recovery for comparison.

RESULTS: In CON and HHT group P20 were (p > 0.05) all the time, but in HCL group P20 after post-ex decreased (p < 0.05) and recovery after an hour rest (p > 0.05) compared to pre-ex value. In HHT group P100 were no significant differences (p > 0.05) all the time or in CON and HCL group decreased (p < 0.05) after mid-ex and post-ex respectively. After an hour rest P100 in HCL group recovered (p > 0.05) or in CON group was significantly different (p < 0.05) compared to pre-ex value. MVC values in all three groups decreased (p < 0.05) after mid-ex and post-ex compared to pre-ex 100% values and after an hour rest did not recover in CON and HHL group (p < 0.05) or HCL (p > 0.05). Quadriceps muscle CAR decreased (p < 0.05) after mid-ex and post-ex and after an hour rest remain significant difference (p < 0.05) in HHT group. In CON group CAR mean decreased (p < 0.05) after post-ex and after an hour rest. In HCL group CAR value did not difference (p > 0.05) all the time. There were no significant differences in electrically evoked muscle properties, MVC and CAR between groups.

CONCLUSION: It follows that performing submaximal intermittent isometric contractions with local head cooling central fatigue didn’t assert and recovery after workload improve.
LOW FITNESS IS ASSOCIATED WITH HIGH CHEMERIN CONCENTRATIONS IN MEN WITH IMPAIRED GLUCOSE REGULATION

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PURPOSE: Elevated chemerin concentration and secretion are associated to insulin resistance, metabolic syndrome (MetS), non-alcoholic fatty liver disease and type 2 diabetes (T2D). Several studies have shown that exercise reduces chemerin concentration and improves insulin sensitivity in obese subjects having MetS or T2D. Little is known about the role of endurance fitness in adipokine profile and indices related to MetS and their associations in middle-aged men with impaired glucose regulation (IGR).

METHODS: In-total, 117 overweight or obese men (BMI 25.1 - 34.9) (mean age 54 yrs, range 40 - 65 yrs) with IGR participated the study. Exercise capacity was estimated by the 2 km UKK walking test and body composition by bioimpedance (Inbody 3.0). Fasting blood samples were drawn for the immunochemical analyzes of chemerin, leptin and tumor necrosis factor-α (TNF-α) and the indices related to MetS (Atherogenic Index of Plasma (AIP), fatty liver index (FLI), and Homeostasis Model Assessment for Insulin resistance index (HOMA-IR)) were calculated. The participants were divided into high fitness group (n = 58) and low fitness group (n = 59) by the median value of the estimated maximal oxygen uptake (28.5 ml/kg/min) calculated by the UKK walking test gender-specific equations (UKK institute, Tampere, Finland). The data was analyzed using Pearson correlations, linear regression analysis, and the Mann-Whitney U-test.

RESULTS: Men with higher fitness had lower serum chemerin (64.6 ± 3.5 µg/ml versus 52.8 ± 2.6 µg/ml, p < 0.05) and plasma leptin (14.6 ± 2.0 µg/ml versus 7.3 ± 0.9 µg/ml, p < 0.05) concentrations than men with lower fitness. Men with higher fitness also had lower AIP, FLI, and HOMA-IR (p < 0.05) than men with lower fitness. Higher fitness was inversely associated with serum chemerin concentration also after adjustment for body fat percentage (Beta = -0.241; p < 0.05). Higher fitness was associated with lower AIP (Beta = -0.362; p < 0.001) and FLI (Beta = -0.225, p < 0.05). A positive correlation between chemerin and TNF-α concentration was found in the low fitness group (r = 0.322, p < 0.05) however, a similar relationship was not observed among the high fitness group.

CONCLUSION: Being in the higher fitness group was associated with lower serum chemerin concentration as well as lower AIP and FLI in middle-aged men with IGR. These results suggest that prediabetic men with in higher aerobic fitness are metabolically healthier than men with lower aerobic fitness.
THE EFFECTS OF PHYSIOTHERAPY ON THE RESPIRATORY CAPABILITY OF PATIENTS WITH RESPIRATORY DISEASES

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PURPOSE: To evaluate the effects of aquatic and gym physiotherapy on the respiratory capability in adult patients with respiratory diseases.

METHODS: The trial was performed with 40 patients (age 53.2 ± 13.7 years old), both women (n = 26) and men (n = 14) with various respiratory diseases. Patients were referred for outpatient rehabilitation. The I group (n = 20) – was assigned to use gym physiotherapy (5 days per week, 30 min a day), II group (n = 20) – used aquatic therapy (depth 150 - 165 cm, t 33 - 36 °C). Respiratory capabilities of patients were tested before and after aquatic and gym physiotherapy using spirometer SpiroMed 250. The statistical analysis was performed using SPSS 19 program package.

RESULTS: Vital capacity increased from 88.30 ± 19.19 to 101.70 ± 18.09% (p < 0.05) in patients from the aquatic physiotherapy group and vital capacity values significantly increased from 80.20 ± 17.74 to 88.35 ± 18.98% (p < 0.05) in patients from gym physiotherapy group. Participants rehabilitating with aquatic physiotherapy had their vital capacity indicators increased more (13.40 ± 7.89%) than patients from the gym physiotherapy group (8.40 ± 4.93%). Patients from aquatic physiotherapy group had their forced vital capacity indicators increased significantly from 79.85 ± 15.97 to 93.95 ± 16.61% (p < 0.05). Patients who had gym physiotherapy had their forced vital capacity rates significantly increased from 70.85 ± 14.77 to 79.45 ± 16.12% (p < 0.05). Forced expiratory volume rates significantly increased during the first second from 74.90 ± 16.0 to 85.50 ± 15.57% (p < 0.05) from the patients of aquatic physiotherapy group. Patients from the gym physiotherapy group had their forced expiratory volume rates significantly increased during the first second from 68.80 ± 19.11 to 74.30 ± 18.70% (p < 0.05). By comparison, forced expiratory volume in the first second indicators changed more in patients from the aquatic physiotherapy group (10.60 ± 6.28%) than the patients from the gym physiotherapy group (5.50 ± 6.41%). There was a statistically significant difference between two groups of patients (p < 0.05).

CONCLUSION: Vital capability, forced vital capacity and forced expiratory volume in the first second improved significantly more in patients from the aquatic therapy group, in comparison with gym physiotherapy group patients.
RISK FOR RELATIVE ENERGY DEFICIENCY IN SPORT SYNDROME IN YOUNG BALLET DANCERS

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PURPOSE: To assess the risk for relative energy deficiency in sport syndrome (RED-S) in young ballet dancers. Athletes in leanness-demanding sports have an increased risk for relative energy deficiency in sport syndrome (RED-S) and for developing disordered eating behaviour (DE) and eating disorders (EDs). Female athletes should consume sufficient energy: 30 - 45 kcal/kg fat-free mass (kg FFM) a day. 30 kcal/kg FFM a day might be the lower threshold of energy availability for females, muscle protein synthesis is reduced even at energy availability (EA) of 30 kcal/kg FFM a day.

METHODS: Thirty-nine female ballet dancers (age 12 - 14 years) and seventy female respondents from ordinary school as controls (age 13 - 15 years) were selected to participate in the study. All ballet dancers had been actively training for at least 3 years (mean ± SD; 5.8 ± 2.4 years), training volume at the time of the study was 24.4 ± 3.4 hr/week. Dietary intakes were assessed using 3-day food record questionnaire. Multi frequency bioelectrical impedance analyser was used. Controls reported no history of participation in competitive sports.

RESULTS: Considering the 12% level for body fat percentage (%BF) for aesthetic sports as critical, half of ballet dances are too lean for healthy growth and performance (51.3% (CI = 15.7; 35.6 - 67.0%) vs. 4% (CI = 5.4; 0.27 - 11.2%)). Recommended amount 35 - 45 kcal/kg FFM a day for aesthetic sports do not reach 42.1% (CI = 11.5; 27.6 - 50.7%) of ballet dancers and 39.1% (CI = 15.7; 26.4 - 57.8%) participants from control group and it does not differ statistically significantly between groups (p > 0.05). Ballet dancers’ mean intake of energy and all macronutrients who consume less than 35 kcal/kg FFM a day statistically significant lower than those consuming 35 - 45 or more kcal/kg FFM a day (p < 0.001). The mean weight, BMI are less for those who consume less than 35 kcal/kg FFM a day (p < 0.05), FFM (p < 0.05) and FFMI (p < 0.001) is lower than those consuming 35 - 45 or more kcal/kg FFM a day.

CONCLUSION: Aproximatelly half if young ballet dancers are at risk of developing RED-S. Those at risk of RED-S have greater nutrional deficiency compare with those consuming more energy. Energy deficiency more affect muscle mass than body fat level.
AORTIC ROOT SIZE IN LITHUANIAN ATHLETES

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PURPOSE: To measure the diameter of aortic root and to evaluate differences between athletes and nonathletes, also differences between endurance-trained and strength-trained athletes

METHODS: A pilot study has been performed. Approval from Bioethics Centre of Lithuanian University of Health Sciences (NR. BEC –MF-481) was received. The study was performed at Kaunas Sports Medicine Center. 218 people (age 21.97 ± 5.28 years) underwent transthoracic echocardiography: 185 athletes (endurance-trained 35 women and 86 men; strength-trained 22 women and 42 men) and 33 nonathletes (17 women, 16 men). The end-diastolic aortic diameters were measured at 2 locations: the aortic valve annulus (Aoann) and the sinus of Valsalva (Aosin). Aortic root mean values for body surface area were presented (RAoann and RAosin). The data was presented as the mean ± SD. The non-parametric Wilcoxon-Mann-Whitney test was used to compare the independent samples. Differences were significant at p < 0.05.

RESULTS: 1. Women athletes: Aosin - 29.02 ± 2.37 mm, RAosin - 16.47 ± 1.85 mm/m2; Aoann - 20.29 ± 1.87 mm, RAoann - 11.49 ± 1.21 mm/m2. Women nonathletes: Aosin 27.57 ± 2.75 mm, RAosin - 15.93 ± 1.85 mm/m2, Aoann - 19.43 ± 1.62 mm, RAoann - 11.25 ± 1.39 mm/m2. However, differences were not significant. 2. Men athletes: Aosin - 31.24 ± 3.47 mm, RAosin - 15.87 ± 2.01 mm/m2; Aoann - 22.52 ± 2.41 mm, RAoann - 11.21 ± 1.39 mm/m2. Men nonathletes - Aosin 30.82 ± 3.4 mm, RAosin - 15.7 ± 1.75 mm/m2, Aoann - 22.19 ± 2.6 mm, RAoann - 11.26 ± 0.75 mm/m2. However, differences were not significant. 3. Strength-trained women RAosin 17.50 ± 1.75 mm/m2, RAoann - 12.47 ± 1.42 mm/m2, endurance-trained women RAosin 16.19 ± 1.79 mm/m2, RAoann 11.23 ± 1.01 mm/m2. Differences were significant (p < 0.05). 4. Strength-trained men RAosin 16.02 ± 1.81 mm/m2, RAoann - 10.91 ± 1.04 mm/m2, endurance-trained men RAosin 15.73 ± 1.87 mm/m2, RAoann - 11.53 ± 1.17 mm/m2.

CONCLUSION: In conclusion, the differences between athletes and nonathletes aortic root diameter (at the annulus and the sinus of Valsalva) were not significant in both men and women. However mean values for body surface area were significantly greater in strength-trained women than in endurance-trained women.
THE RARE POLYMORPHISM IN THE MSTN GENE IN LITHUANIAN ELITE ATHLETES

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PURPOSE: Myostatin (MSTN) gene codes for the protein myostatin, a negative regulator of muscle growth. Associations between the variants in the MSTN gene and muscle size as well as cardiovascular system properties have been shown. In some cases individuals are presented with double-sized muscle which appeared due to mutations in the MSTN gene. Proper functionality of myostatin protein ensures the effective development of muscle cells which is essential for physical performance. The aim of the study was to identify the influence of candidate genetic markers in the MSTN gene on the physical performance of Lithuanian elite athletes.

METHODS: The study involved 103 elite Lithuanian athletes (67 male, 36 female) and 127 non-athlete controls (57 male, 59 female) from the general Lithuanian population. DNA was extracted by phenol-chloroform technique and the coding regions were amplified by polymerase chain reaction. The MSTN gene was sequenced using automatized Sanger technique.

RESULTS: After having performed the sequencing of the MSTN gene one athlete was discovered to have a rare SNP in the second exon of the MSTN gene (c.458A>G, rs1805086). The polymorphism was not determined in controls group. c.[458A>G];[458A>G] genotype was found to be present in a former professional canoe rower athlete who had his best results achieved in 2009, successfully performing in World and European championships. Based on this evidence, we have performed distinct phenotypical data analysis. The athlete was 180 cm height and 86.5 kg weight, had a high value of muscle mass (46 - 49 kg) and relatively low fat mass (6 - 8 kg). BMI was calculated to be 26.0 - 27.0 which showed a high muscle-fat mass index (5.83 - 7.12). Handgrip strength was 62 kg, STEMP 2000 - 2500 W (measured by vertical jump test), AAMP 1500 - 1900 W (measured by stair climbing test). Analysis of aerobic capacity measurements, such as VO2max, life lung volume, heart rate during and after exercise, showed great adaptation of cardiovascular system to high physical loads.

CONCLUSION: The polymorphism in the second exon of the MSTN gene (c.458A>G) was found only in one athlete – a high-level canoe rower. During the period of the annual sporting season, the athlete’s phenotypical data remained at the same levels which leads to the conclusion that the MSTN c.458A>G polymorphism in combination with other genetical and environmental factors may be associated the athlete’s general physical performance and overall high results.
SCHOOL-BASED PHYSICAL ACTIVITY INTERVENTIONS FOR 6-12-YEAR OLD SCHOOLCHILDREN

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PURPOSE: Insufficient physical activity (PA) among youth and children is a global health problem. The promotion of PA is an essential strategy to improve the health of youth. The school setting is an ideal environment for PA interventions as all children go to school and have access to possibilities for PA the school can offer. Prior to developing sustainable school-based PA programmes for children it is necessary to find out and describe the effective components of previous objectively measured PA interventions.

METHODS: A literature selection was carried out including original full-text articles, published in peer-reviewed journals 2009 - 2014, describing school-based PA interventions for 6 to 12 year old children, objectively measured by accelerometers or pedometers. A structured electronic literature search was carried out. Following search strings were used: school-based physical activity intervention AND physical activity intervention AND physical activity OR physical activity programme AND accelerometer.

RESULTS: Seventeen relevant trials of sufficient quality performed in 10 different countries were identified. All selected studies differed in their duration, number of participants and the content of interventions. The main characteristics of PA intervention trials were found. The average sample size was 483 students. The duration of intervention ranged from 2 weeks to 2 years. The main inclusion criteria was objectively measured PA, thus accelerometers or pedometers were used in all studies. Significant increase of PA was reported in 16 studies. The increase of PA during schoolday or recess was shown both in 4 studies. Daily or overall PA increased in 7 studies. Weekly PA or participation in sports clubs were described both in 1 study. In 6 studies, the increased PA during recess or activity breaks had simultaneous effect on daily PA. The interventions, including mandatory elements as additional PE lessons or PA homework seemed to be most effective in increasing PA. School environment, access to sports equipment and engagement of parents are also important factors influencing students’ PA level.

CONCLUSION: Effective school-based intervention models include additional PE lessons, active recess, activity breaks and changes in school environments. Multicomponent interventions had more effect on students’ PA level. Objective comparability of the changes in the PA level measurements enables to create the most suitable intervention programmes.
INGESTION OF SODIUM CITRATE ENHANCES REHYDRATION BUT DOES NOT IMPROVE ENDURANCE PERFORMANCE IN THE HEAT

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PURPOSE: To investigate the effects of sodium citrate (CIT) ingestion on rehydration after exercise-induced dehydration and on subsequent endurance performance in the heat.

METHODS: Ten trained cyclists and triathletes (age 28.3 ± 4.37 years; VO\textsubscript{2max} 57.17 ± 5.60 ml/kg/min) completed two 40-km time-trials on a cycle ergometer in the heat (air temperature 32°C, relative humidity 46%) with preceding placebo (PLC) or CIT ingestion in a double-blind, randomized, crossover manner. In both PLC and CIT trials, the subjects firstly exercised on a cycle ergometer until they lost ca 4% of body mass (BM). During 16 h recovery period, they ate prescribed diet supplemented with encapsulated CIT (600 mg·kg\textsuperscript{-1}) or PLC and drank water ad libitum. Next morning the subjects performed a 40 km cycling time-trial.

RESULTS: Ingestion of CIT during recovery after ca 4% dehydration did not improve performance in 40 km time-trial. Cycling time in PLC and CIT trials (70.06 ± 1.66 min and 70.28 ± 2.05 min, p > 0.05, respectively) did not differ. There were no between trial differences in BM before and after dehydrating exercise (p > 0.05). Water intake during recovery was greater (p ≤ 0.05) in CIT compared to PLC trial, but there was no between trial difference in excreted urine volume (p = 0.116). Water retention was greater (p = 0.0001) in CIT than in PLC. Increases in plasma volume and BM during recovery were greater in CIT compared to PLC trial (in both occasions p = 0.0002). There was no between trial difference in BM loss (p > 0.05) during 40 km time-trial, but water intake was greater (p = 0.013) in CIT compared to PLC trial. Heart rate immediately before 40 km time-trial was higher (p = 0.007) in CIT than in PLC, but this difference disappeared during the test exercise. Post-exercise blood lactate concentration was higher (p = 0.032) in CIT (7.52 ± 2.65 mmol/l) compared to PLC trial (5.72 ± 1.35 mmol/l). During 40 km time-trial rectal temperature in CIT and PLC trials did not differ (p > 0.05) until 60 min, but starting from that time point until the end of exercise rectal temperature was higher (p < 0.05) in PLC.

CONCLUSION: Ingestion of sodium citrate during a 16 h recovery period after an exercise-induced dehydration (ca 4%) enhances rehydration, but does not improve endurance performance in 40 km cycling time-trial in the heat.
EFFECTS OF DIFFERENT STRENGTH WORKOUT REGIMES ON STRENGTH AND ENDURANCE CHARACTERISTICS IN PEOPLE WITH SPINAL CORD INJURY

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PURPOSE: To find the most suitable method of strength training and to compare the effect of two different training regimes on the characteristics of maximum strength and power endurance in people with SCI.

METHODS: The study included 10 people with SCI ranged in age from 26 to 52 years. Participants were divided into two groups who attended the gym for 7 times in 3 weeks. Maximum overcoming resistance test and maximum number of repetitions test were performed by exercise machines “CYBEX Bravo 8800” and “IMPACT LC9830”. The first group performed the exercises at a moderate speed – the concentric and eccentric phase lasted for about 2 s, at the end of each phase there was a pause for 1 s. The movements were executed with a full range, at a steady pace. 8-12 repetitions in one attempt, with resistance around 75% of the maximum to the extreme tiredness. A total of 3 rounds of each exercise, with 2 min breaks between the attempts. The second group performed the exercises at a slow pace – the concentric and eccentric phase lasted for about 10 s, without pauses during the exercise. The movement was executed without full amplitude of joint movement, without relaxation of muscles at the final stages until muscle failure occurred within 90 to 120 s from the beginning of the exercise. In this group the first resistance value of the workout exercises was about 65 % of the maximum. If the participant was able to carry out the exercise for more than 120 s, the next workout resistance was increased. If the participant was unable to perform qualitative exercise for more than 90 s, in the next workout the resistance was reduced.

RESULTS: For the first group the strength increased by 19.2%, while for the second group - by 20.3%. The first group had changes (p < 0.05) in strength in one exercise, the second group – in three exercises. In both groups the greatest increase of strength was in the exercise “straightening the forearm, using high-blocks”. In this exercise for the first group the strength was increased by 44%, in the second group - by 50% (p < 0.05). In the first group the force strength values, which were established after the maximum number of repetitions lifting the 50% weight of the maximum weight of what was the end of the study, in four exercises on average decreased by 9.5%, while in the second group increased by an average of 17.3%, which indicates that for the first group the strength increased faster than the endurance, while for the second group, the endurance of strength increased faster. Study should be continued with more participants. Data can be used to develop guidelines for coaches working with SCI patients.

CONCLUSION: In both training programs the maximum strength for people with spinal cord injury in 3 weeks (5 trainings) was greatly increased. In the changes of the maximum strength there were no significant differences in the results between the two programs, although in 3 of 4 exercises an insignificantly greater increase in strength was provided by the second program, which uses slow motion workout. Strength endurance performance was significantly improved for people, who trained by the Group 2 program.
KOOS INDEX AND KNEE FUNCTION IN SUBJECTS WITH DIFFERENT RADIOPHGRAPHIC TYPES OF KNEE OSTEOARTHRITIS IN AN ESTONIAN LONGITUDINAL STUDY.

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Development of knee osteoarthritis (KOA) is slow with nonlinear or phasic progression. Our follow-up study of the middle-aged population based cohort during six years by KOOS index, revealed significant decrease in some self-reported functional abilities. In this report we present data from the last three years period.

PURPOSE: To characterize status of subsets of patients with early and advanced KOA by KOOS questionnaire, functional abilities of lower limb and their associations with radiographic KOA.

METHODS: The cohort of 173 subjects (109F; 64M) from symptomatic and non-symptomatic Estonian population (mean age 50) were studied. KOOS questionnaire, four performance tests: 1) stair climbing (SCT, cm); 2) rising from the low chair (RC cm); 3) timed UP & GO (TUG, s) and 4) 30 meter walking (s) tests were used. Radiographs of both knees of the tibio-femoral (TF) and axial radiographs of the patello-femoral (PF) joint were taken and assessed according to Spector (1992) and Nagaosa (2000) systems. According to longitudinal follow-up the subjects were divided into six groups (Table 1, G1–G6).

RESULTS: KOOS results. Highly significant differences expressed by all 5 subscales were observed between the patients (G2 - G6) and controls (G1). Among the patients with knee complaints significant differences were found between the female patients from groups G2 and G4: Sp/Rec (p=0.02) and OL (p=0.002). The differences were even more expressed between the female patients from G2 and G6 (with progressive OA): Sp/Rec (p=0.0004) and QL (0.014). The differences between other groups (G3 and G5) were statistically not significant. Functional tests and radiography. The results of the performance tests and 30 m walk but not TUG test, were significantly different between the patients (G2-G6) and controls (G1). In more advanced cases of OA (G4 and G6) TUG results were slower in female patients from those of G2. The differences were much more expressed between the above mentioned groups in all performance tests: RC (p = 0.00 - 0.00004), SCT (p = 0.003 - 0.0003). The differences between other radiographic groups (G3 and G5) were statistically not significant.

CONCLUSIONS: 1.Highly significant differences were observed between the patients and controls in all KOOS subscales as well as by three out of four performance tests. 2. Significant decline in KOOS subscales Sp/Rec and QL in female patients with advanced (G4) and progressive (G6) KOA was found. 3. Female patients with advanced (G4) and progressive (G6) KOA had worse ability in performance tests in comparison with those without radiographic OA. The differences between early radiographic groups (G3 and G5) were statistically not significant.
FACTORS AFFECTING RUNNING ECONOMY OF HIGH LEVEL EUROPEAN DISTANCE RUNNERS

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PURPOSE: The aim of the present study was to investigate lower limb anthropometric and composition parameters related to running economy (RE) and relationships between RE and maximal oxygen uptake (VO2max).

METHODS: Running economy (RE) at the speeds of 14, 16 and 18 km/h (189 ± 12; 188 ± 11; 187 ± 11 O2 ml/kg/km) and maximal oxygen uptake (VO2max) (67.3 ± 2.9 ml/kg/min) of 13 high level distance runners were determined on a motorised treadmill. Anthropometric parameters were measured and body composition determined (DXA).

RESULTS: BMI was related with RE at the speed of 14 (r = 0.659; p = 0.014), 16 (r = 0.660; p = 0.014) and 18 km/h (r = 0.624) and lower leg length was negatively correlated with RE at the speed of 16 km/h and showed such tendency at the speed of 14 and 18 km/h. VO2max showed moderate relationship with RE at the speeds of 14, 16 and 18 km/h (r = 0.610, p = 0.030; r = 0.592, p = 0.033; r = 0.613, p = 0.026, respectively) and was confirmed by subsequent partial correlation analysis.

CONCLUSIONS: While lower leg length and BMI indicated relationship with RE, none of the calculated body composition and anthropometric ratios were related with RE or performance. Dissociation between RE and performance and association between RE and VO2max would suggest that RE could be at least partly compensated by VO2max to achieve high performance results.
PURPOSE: The aim of this review article was to evaluate that sports and physical exercise may have a positive effect on increase in bone mass and quality.

METHODS: The search for scientific literature relevant to this review was performed using US National Library of Medicine (PubMed), MEDLINE and SportDiscus databases and the terms ‘bone tissue’, ‘osteoporosis’ and ‘physical exercise’. Relevant literature was also sourced from searches of related articles arising from the reference list of those obtained from the database searches.

RESULTS: In women who exercise regularly from an early age, dynamic stress on bone can result in up to a 40% increase in bone mass and quality. Exercise also has an important role in improving the functional independence of the elderly. Muscular strength, coordination, and balance increases with exercise, and the risk of cardiovascular disease and fractures due to falls decreases. Peak bone mass, protection of bone mass, conditioning, and strengthening are all results of exercise, and the risk of falling will be minimized and fractures will be prevented.

CONCLUSION: Primary protection, early diagnosis, treatment and follow-ups are very important in dealing with osteoporosis. The awareness of the public and of healthcare providers should be increased. Parents should also be educated about how to prevent osteoporosis in their children.
INJURY FREQUENCY AND RISK FACTORS ON ELITE ATHLETES: THE INFLUENCE OF MEDICAL CARE PROVIDERS’ AVAILABILITY

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PURPOSE: The variety and frequency of medical care support (MCS) is crucial for athletes’ health enhancement. The aims of this study were to investigate: 1. if medical care providers’ availabilities were correlated to athletes’ risk related factors (i.e. Periodical Health Examination-PHE and Preparticipation Evaluation-PPE status); 2. If injury frequencies were influenced by medical care providers’ availabilities.

METHODS: 335 elite athletes (269 Taiwanese; 121 ♀, 148 ♂, age 23.2 ± 6.9; 66 German; 32 ♀, 34 ♂, age 26.0 ± 7.6) participated in the study. Current or retired national team members of Olympic sports were recruited. The risk of injury questionnaire (Risk-IQ) for elite athletes was employed. Injury frequency of 10 body parts and its relation to therapists were tested with 4 categories of variables: Physiotherapist (MCS-PT), Medical Doctor (MCS-MD), Masseur (MCS-MR) and total amount (MCS-Total). Data were analyzed descriptively (mean±SD), Mann-Whitney U test, Kruskal-Wallis test and Spearman correlation were employed. Significance level was set to p < 0.05.

RESULTS: Significant differences were found between MCS availabilities and nationality (p < 0.01) (e.g. MCS-PT, MCS-MD), between MCS and prescribed medication status (p < 0.05), injury type (p < 0.05) as well as age, sport type, novice, PHE and PPE status (all p < 0.01). Secondly the injury frequency is influenced by MCS Total which correlates with injury frequencies of whole body sum (r = 0.22); back (r = 0.16); shoulder (r = 0.21); elbow (r = 0.16); hip (r = 0.17), for all p < 0.05. All 4 MCS-variables correlate with athletes’ international competition experiences: MCS-PT(r = 0.27), MCS-MD (r = 0.27), MCS-MR (r = 0.23) MCS-Total (r = 0.27), for all p < 0.01.

CONCLUSIONS: The total amount of MCS athletes received was significantly influenced by age, sport type, novice and PHE/PPE status. In this study, the nationality was a factor influencing athletes’ MCS from both physiotherapist and physician. Chronical type injury received more masseurs’ treatment than acute type. Athletes’ competition experience correlated significantly with all MCS categories. MCS-Total correlated significantly with injuries of back, shoulder, elbow and hip, besides these 4 body parts, MCS from physician and physiotherapist also correlated with head, knee, leg and foot injuries. Low significant correlation values found in this study.