The most significant publications of Lithuanian Sports University
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INTRODUCTION

1. History and current status

Lithuanian Sports University (LSU), founded in 1934, is a specialised public higher education institution that has developed its unique traditions in sport, leisure and health sciences. With its mission to contribute to the sustainable development of society through international-level research and academic excellence, LSU is known as a leading academic and research centre in sports science in the Baltic Sea region. Starting with the enrolment of 100 students, the LSU has developed and expanded over the years and decades into an institution with nearly 2000 students.

Lithuanian Sports University is an open European university, constantly creating and providing study programmes for all three cycles as well as continuous education programmes based on the latest research and technologies.

2. Vision

To become one of the leading universities of sports, physical education, rehabilitation (physiotherapy) and health sciences in Europe, and the best in this area in the Baltic Sea Region. By the year 2017, the LSU uniqueness in sport, physiotherapy and health promotion, and appropriate application of sports science in studies and innovations will have ensured our position of a leading sports, physiotherapy and health science University in the Baltic Sea Region.

3. Mission Statement

Promote coherent progress of the society, and be useful to it providing exclusive international level research and studies in sports science.

4. Strategic aims

International Leader in Research. Concentrate all available resources in the development of high quality research and innovations which would serve Lithuanian and world public welfare, foster health promotion through sport and physical activity.

High Quality and Attractive Studies. Execute modern and relevant study programmes and recruit talented and motivated students.
Development of LSU Identity. Be leader in the areas of sport and physical education science, physiotherapy and health promoting physical activity, which would be recognized by the society and communities of other institutions of higher education.

Effective management. Ensure the organization’s flexibility, ability to adapt to changes and to improve.

5. Strategic areas of research

In 2012 the Senate approved five research areas:
- Coaching Science, Sports Physiology and Genetics.
- Health, Physical and Social Education in the Society Undergoing Changes.
- Physiological and Social Aspects of Empowerment of Disabled.
- Skeletal Muscles, Motor Control and Rehabilitation.

6. Main Directions of Research

LSU carries out fundamental and applied research in the area of skeletal and nervous systems, searches for a variety of optimal methods of physical activity that would train and develop not only muscle and bone health, cardiovascular and respiratory system working capacity, but also the brain, particularly cognitive working capacity for people of all ages – children and the elderly, the disabled and non-disabled, athletes and non-athletes.

Physical activity positively affects short-term and working memory if optimal exercise is applied; it trains the executive or so-called self-control function of the brain. Our goal is to optimize exercise and try to link it with the improvement of the quality of life and learning outcomes.

In the area of leisure management and economics researchers analyze the organization of leisure industry, the development of business economics and the means of healthy life and human health promotion.

In the area of sports genetics LSU has strong scientists who carry out research in the field of genetics in collaboration with colleagues from England, and they try to establish the genes which are responsible for obesity, as well as the ways how genetics could serve as a means of reducing obesity, strengthening the body and the intellectual potential of people in Lithuania.

7. Research assessment

Research at the Lithuanian Sports University is carried out in the Institute of Sport Science and Innovations and the departments of the faculties of Sport Education and Sport Biomedicine.
At the end of 2014 and the beginning of 2015, for the first time international experts provided a thorough assessment of the quality of research performed in all Lithuanian scientific institutions. Research activities of LSU Faculty of Sport Biomedicine were assessed as “high international level” research, and those of the Faculty of Sport Education – as “high national level research with obvious international elements”.

Biomedical science has been evaluated and ranked among the top five Lithuanian universities – institutions, and sports education science – among the best social science institutions.

In the future, the most important aim of the Lithuanian Sports University remains the highest level knowledge in sport science. By 2030, in the area of biomedical sciences, the university plans to establish itself among the leaders in the world together with the Scandinavian scientific cluster of motor and muscle research, in the social sciences – to be leaders in Lithuania and the Baltic States.

The booklet presents only the main and most significant publications of 2012–2014 by Lithuanian Sports University researchers, which were published in Thomson Reuters Web of Knowledge database and peer-reviewed journals in other international databases. We believe that a wide circle of interested Lithuanian and European people will make good use of our research results.
COACHING SCIENCE, SPORTS PHYSIOLOGY AND GENETICS

Most significant “3”


Lionikas, Arimantas; Kiličius, Audrius; Bürger, Lutz; Meharg, Caroline; Carroll, Andrew M.; Ratkevičius, Aivaras; Venckūnas, Tomas; Blizard, David A. Genetic and genomic analyses of musculoskeletal differences between BEH and BEL strains // Physiological Genomics. Bethesda: American Physiological Society. ISSN 1094-8341. 2013, vol. 45, no. 20, p. 940–947. [Impact Factor 2,812]

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We studied the relation between two common force modifications in skeletal muscle: the prolonged force depression induced by unaccustomed eccentric contractions, and the residual force depression (rFD) observed immediately after active shortening. We hypothesized that rFD originates from distortion within the sarcomeres and the extent of rFD: 1) correlates to the force and work performed during the shortening steps, which depend on sarcomeric integrity; and 2) is increased by sarcomeric disorganization induced by eccentric contractions. Nine healthy untrained men (mean age 26 yr) participated in the study. rFD was studied in electrically stimulated knee extensor muscles. rFD was defined as the reduction in isometric torque after active shortening compared with the torque in a purely isometric contraction. Eccentric contractions were performed as 50 repeated drop jumps with active deceleration to 90° knee angle, immediately followed by a maximal upward jump. rFD was assessed before and 5 min to 72 h after drop jumps. The series of drop jumps caused a prolonged force depression, which was about two times larger at 20-Hz than at 50-Hz stimulation. There was a significant correlation between increasing rFD and increasing mechanical work performed during active shortening both before and after drop jumps. In addition, a given rFD was obtained at a markedly lower mechanical work after drop jumps. In conclusion, the extent of rFD correlates to the mechanical work performed during active shortening. A series of eccentric contractions causes a prolonged reduction of isometric force. In addition, eccentric contractions exaggerate rFD, which further decreases muscle performance during dynamic contractions.


Our purpose was to compare the effect of a periodized preparation consisting of power endurance training and high-intensity power training on the contractile properties of the quadriceps muscle and functional performances in well trained male sprinters (n = 7). After 4 weeks of high-intensity power training, 60 m sprint running time improved by an average of 1.83% (SD = 0.96; p < .05). This improvement was inversely related to an increase in maximal voluntary contraction torque (r = –.89, p < .05) and poorly correlated with changes in the contractile kinetics of the quadriceps muscle (r range from .36 to –46). These findings suggest that sprint performance is poorly predicted by muscle intrinsic properties and that a neural adaptation appears to explain most of the observed functional adaptations.

The aim of this study was to monitor the changes in indirect markers of muscle damage during 3 weeks (9 training sessions) of stretch-shortening (drop jump) exercise with constant load alternated with steep increases in load. Physically active men (n = 9, mean age 19.1 years) performed a program involving a rapid stepwise increase in the number of jumps, drop height, and squat depth, and the addition of weight. Concentric, isometric maximal voluntary contraction (MVC), and stimulated knee extension torque were measured before and 10 minutes after each session. Muscle soreness and plasma creatine kinase activity were assessed after each session. Steep increments in stretch-shortening exercise load in sessions 4 and 7 amplified the postexercise decrease in stimulated muscle torque and slightly increased muscle soreness but had a minimal effect on the recovery of MVC and stimulated torque. Maximal jump height increased by 7.8 ± 6.3% (p < 0.05), 11.4 ± 3.3% (p < 0.05), and 12.8 ± 3.6% (p < 0.05) at 3, 10, and 17 days after the final training session, respectively. Gains in isometric knee extension MVC (7.9 ± 8.2%) and 100-Hz-evoked torque (9.9 ± 9.6%) (both p < 0.05) were observed within 17 days after the end of the training. The magnitude of improvement was greater after this protocol than that induced by a continuous constant progression loading pattern with small gradual load increments in each training session. These findings suggest that plyometric training using infrequent but steep increases in loading intensity and volume may be beneficial to athletic performance.


The aim of this study was to evaluate the effects of applying mild electrical myostimulation (EMS) or passive rest (PR) on restoring the work capacity (WC) of the skeletal muscles in athletes. Nineteen long-distance runners participated in the study. They were divided into 2 groups according to the principle of rotation: a PR (control) and an EMS (experimental) group. They were examined before training and 10 minutes, 4 hours, and 18 hours after training. Muscle motor function was measured as the maximal voluntary contraction (MVC) and WC. The intensity of the arterial blood flow and the venous reserve volume with venous occlusion plethysmography, and
the stroke volume, cardiac output, and heart rate with tetrapolar rheography were determined. The application of EMS significantly increased the MVC and WC of the calf muscles (p ≤ 0.05) compared with the corresponding parameters recorded after PR. The venous reserve volumes after PR (0.61 ± 0.07 ml per 100 ml) and EMS (0.91 ± 0.11 ml per 100 ml) differed significantly (p ≤ 0.05). Mild EMS is an effective local method of restoring the WC of the muscles. It is greatly superior to PR, which is the traditional way of recovering from exercise. The increased WC of the muscle was mediated by improved blood flow in the stimulated muscles and an increased venous blood pump. The systemic circulation, evaluated with cardiac indicators such as stroke volume, cardiac output, and heart rate, played no significant role in the effect.


Both baseline values and adaptive changes in mice can vary depending on the genetic background. We aimed to assess variation in a battery of variables and their adaptations to endurance training in six inbred mouse strains. Males, n = 184, from A/J, BALB/cByJ, C3H/HeJ, C57BL/6J, DBA/2J, and PWD/PhJ strains were assigned to a control or an endurance group (5 weeks swimming exercise). Enzyme activity, histology of soleus (SOL) muscle, swimming endurance, cardiac ventricular and hind limb muscle weight, and femur length were examined. Endurance capacity, morphological and histological variables, and enzyme activity substantially differed among strains. For example, SOL weight was twofold higher and cross-sectional area (CSA) of fibers was ~30% greater in C57BL/6J than in PWD/PhJ strain. The CSA of type 1 fibers were larger than type 2A in PWD/PhJ (p < 0.01); however, the reverse was true in DBA/2J and BALB/cByJ strains (p < 0.05). Swimming endurance in DBA/2J strain was ~9 times better than in BALB/cByJ. Endurance training increased the activity of citrate synthase in gastrocnemius across strains (p < 0.01), however, changes in endurance were strain-specific; the C57BL/6J and DBA/2J strains improved substantially, whereas A/J and BALB/cByJ strains did not. In conclusion, genetic background is a potent determinant of the physiological characteristics and adaptations to training in mice.

6. Lionikas, Arimantas; Kilikevičius, Audrius; Bünger, Lutz; Meharg, Caroline; Carroll, Andrew M.; Ratkevičius, Aivaras; Venckūnas, Tomas; Blizard, David A. Genetic and genomic analyses of musculoskeletal differences between BEH and BEL strains //
Berlin high (BEH) and Berlin low (BEL) strains selected for divergent growth differ threefold in body weight. We aimed at examining muscle mass, which is a major contributor to body weight, by exploring morphological characteristics of the soleus muscle (fiber number and cross-sectional area; CSA), by analyzing the transcriptome of the gastrocnemius and by initiating quantitative trait locus (QTL) mapping. BEH muscles were four to eight times larger than those of BEL. In substrain BEH+/+, mutant myostatin was replaced with a wild-type allele; however, BEH+/+ muscles still were two to four times larger compared with BEL. BEH soleus muscle fibers were two times more numerous (p < 0.0001) and CSA was two times larger (p < 0.0001) compared with BEL. In addition, soleus femoral attachment anomaly (SFAA) was observed in all BEL mice. One significant (Chr 1) and four suggestive ( Chr 3, 4, 6, and 9) muscle weight QTLs were mapped in a 21-day-old F2 intercross ( n = 296) between BEH and BEL strains. The frequency of SFAA incidence in the F2 and in the backcross to BEL strain (BCL) suggested the presence of more than one causative gene. Two suggestive SFAA QTLs were mapped in BCL; however, their peak markers were not associated with the phenotype in F2. RNA-Seq analysis revealed 2,148 differentially expressed (p < 0.1) genes and 45,673 single nucleotide polymorphisms and > 2,000 indels between BEH+/+ and BEL males. In conclusion, contrasting muscle traits and genomic and gene expression differences between BEH and BEL strains provide a promising model for the search for genes involved in muscle growth and musculoskeletal morphogenesis.

Here, we test the hypothesis that continuous concentric exercise training renders skeletal muscles more susceptible to damage in response to eccentric exercise. Elite road cyclists (CYC; n = 10, training experience 8.1 ± 2.0 years, age 22.9 ± 3.7 years), long-distance runners (LDR; n = 10, 9.9 ± 2.3 years, 24.4 ± 2.5 years), and healthy untrained (UT) men ( n = 10; 22.4 ± 1.7 years) performed 100 submaximal eccentric contractions at constant angular velocity of 60° s⁻¹. Concentric isokinetic peak torque, isometric maximal voluntary contraction (MVC), and electrically induced knee extension torque were measured at baseline and immediately and 48 h after an
eccentric exercise bout. Muscle soreness was assessed and plasma creatine kinase (CK) activity was measured at baseline and 48 h after exercise. Voluntary and electrically stimulated knee extension torque reductions were significantly greater (p < 0.05) in UT than in LDR and CYC. Immediately and 48 h after exercise, MVC decreased by 32% and 20% in UT, 20% and 5% in LDR, and 25% and 6% in CYC. Electrically induced 20 Hz torque decreased at the same times by 61 and 29% in UT, 40 and 17% in LDR, and 26 and 14% in CYC. Muscle soreness and plasma CK activity 48 h after exercise did not differ significantly between athletes and UT subjects. In conclusion, even though elite endurance athletes are more resistant to eccentric exercise-induced muscle damage than are UT people, stretch–shortening exercise-trained LDR have no advantage over concentrically trained CYC.


Background. The effect of deep mineral water (DMW) with moderate mineralization on the recovery of physical performance after prolonged dehydrating aerobic exercise in the heat was studied in nine healthy, physically active (VO2max = 45.8 ± 8.4 mL kg⁻¹ min⁻¹) women aged 24.0 ± 3.7 years. Methods. We conducted a randomized, double-blind, placebo-controlled crossover human study to evaluate the effect of ingestion of natural mineral water extracted from a depth of 689 m on recovery from prolonged fatiguing aerobic running conducted at 30°C. Results. Mean body weight decreased by 2.6–2.8% following dehydrating exercise. VO2max was 9% higher after 4 h of recovery after rehydrating with DMW compared with plain water. Leg muscle power recovered better during the slow phase of recovery and was significantly higher after 48 h of recovery after rehydrating with DMW compared with plain water. Conclusions. DMW with moderate mineralization was more effective in inducing recovery of aerobic capacity and leg muscle power compared with plain water following prolonged dehydrating aerobic running exercise.

Alpha-actinin-3 (ACTN3) is an integral part of the Z line of the sarcomere. The ACTN3 R577X (rs1815739) polymorphism determines the presence or absence of functional ACTN3, which may influence the extent of exercise-induced muscle damage. This study aimed to compare the impact of, and recovery from, muscle-damaging eccentric exercise on subjects with or without functional ACTN3. Seventeen young men (20–33 years old), homozygous for the R (n = 9) or X (n = 8) alleles, performed two bouts of stretch – shortening exercise (50 drop jumps) two weeks apart. Muscle soreness, plasma creatine kinase (CK) activity, jump height, maximal voluntary isometric torque (MVC), peak concentric isokinetic torque (IT), and electrically stimulated knee extension torques at 20 and 100 Hz were measured at baseline and at a number of time points up to 14 days after each bout. There were no significant baseline differences between the groups. However, significant time point × genotype interactions were observed for MVC (p = 0.021) and IT (p = 0.011) for the immediate effect of eccentric exercise in bout 1. The RR group showed greater voluntary force decrements (RR vs. XX: MVC, –33.3% vs. –24.5%; IT, –35.9% vs. –23.2%) and slower recovery. A repeated-bout effect was clearly observed, but there were no differences by genotype group. The ACTN3 genotype modulates the response of muscle function to plyometric jumping exercise, although the differences are modest. The ACTN3 genotype does not influence the clearly observed repeated-bout effect; however, XX homozygotes recover baseline voluntary torque values faster and thus may be able to undertake more frequent training sessions.


Purpose. Compression garments are often worn during exercise and allegedly have ergogenic and/or physiological effects. In this study, we compared hemodynamics and running performance while wearing compression and loose-fit breeches. We hypothesized that in neutral-warm environment compression breeches impair performance by diminishing body cooling via evaporative sweat loss and redistributing blood from active musculature to skin leading to a larger rise in body temperature and prolonging recovery of hemodynamics after exercise. Methods. Changes in hemodynamics (leg blood flow, heart rate, and blood pressure during orthoclinostatic test), calf muscle tissue oxygenation, and skin and core temperatures were measured in response to 30 min running (simulation of aerobic training session) followed by maximal 400 m sprint (evaluation of running performance) in recreationally active females (25.1±
4.2 yrs; 63.0 ± 8.6 kg) wearing compression or loose-fit breeches in randomized fashion. Results. Wearing compression breeches resulted in larger skin temperature rise under the garment during exercise and recovery (by about 1°C; statistical power > 85%), while core temperature dynamics and other measured parameters including circulation, running performance, and sensations were similar compared to wearing loose-fit breeches (p > 0.05). Conclusion. Compared with loose-fit breeches, compression breeches have neither positive nor negative physiological and performance effects for females running in thermoneutral environment.

**Other publications in Thomson Reuters Web of Knowledge database**

1. Bružas, Vidas; Stasiulis, Arvydas; Čepulėnas, Algirdas; Mockus, Pranas; Statkevičienė, Birutė; Subačius, Vitalijus. Aerobic capacity is correlated with the ranking of boxers // Perceptual and Motor Skills. Missoula: Ammons Scientific. ISSN 0031-5125. 2014, vol. 119, no. 1, p. 50–58. [Impact Factor 0.521]


3. Kamandulis, Sigitas; Venckūnas, Tomas; Masiulis, Nerijus; Matulaitis, Kęstutis; Balčiūnas, Mindaugas; Derek, Peters; Skurvydas, Albertas. Relationship between general and specific coordination in 8- to 17-year-old male basketball players // Perceptual and Motor Skills. Missoula: Ammons Scientific. ISSN 0031-5125. 2013, vol. 117, no. 3, p. 821–836. [Impact Factor 0.521]


In peer-reviewed journals of other international databases

2012


8. Kniubaitė, Audinga; Skarbalius, Antanas. Relationship between sports experience and anthropometric indices and sport performance in World Women’s Handball


11. Matulaitis, Kęstutis; Skarbalius, Antanas. Исследование сенситивных периодов для развития быстроты и ловкости у юных баскетболистов 7–17 лет // Теория и практика физической культуры. Москва: Теория и практика физической культуры и спорта. ISSN 0040-3601. 2013, no. 1, p. 27–30.

12. Onusaitytė, Gintarė [Jonusaitite, Gintare]; Skarbalius, Antanas [Skarbalyus, Antanas]. Продолжительность, соотношение содержания, объёма и интенсивности тренировочной программы подготовительного периода у гандболисток высокой квалификации // Теория и практика физической культуры. Москва: Теория и практика физической культуры и спорта. ISSN 0040-3601. 2013, no. 1, p. 31–33.


2014


HEALTH, PHYSICAL AND SOCIA EDUCATION IN THE SOCIETY UNDERGOING CHANGES

Most significant “3”

Ding, Ding; Adams, Marc A.; Sallis, James F.; Norman, Gregory J.; Hovell, Melbourn F.; Chambers, Christina D.; Hofstetter, Richard C.; Bowles, Heather R.; Hagströmer, Maria; Craig, Cora L.; Gomez, Luis Fernando; De Bourdeaudhuij, Ilse; Macfarlane, Duncan J.; Ainsworth, Barbara E.; Bergman, Patrick; Bull, Fiona C.; Carr, Harriette; Klasson-Heggebo, Lena; Inoue, Shigeru; Murase, Norio; Matsudo, Sandra; Matsudo, Victor; McLean, Grant; Sjöström, Michael; Tomten, Heidi; Lefevre, Johan; Volbekienė, Vida; Bauman, Adrian E. Perceived neighborhood environment and physical activity in 11 countries: Do associations differ by country? // International Journal of Behavioral Nutrition and Physical Activity. London: BioMed Central LTD. ISSN 1479-5868. 2013, vol. 10, Article Number 57, p. 1–11. [Impact Factor 3,675]


Top “10”

Background and Objective. Epidemiologists agree that physical activity has a protective role in morbidity and mortality mainly through its positive impact on risk factors. So far, most studies have confirmed that CVD risk decreases with an increasing physical activity level, but it is not known what level of physical activity is already sufficient for mortality risk reduction. Thus, the aim of this study was to explore long-term associations between leisure-time physical activity and mortality risk in the Lithuanian urban population. Material and Methods. The MONICA study (1992–1993) and the repeated health examination survey in 2001–2002 were organized as a cohort study of 2642 middle-aged inhabitants from the general Lithuanian population of Kaunas. Two random samples aged 35–64 years were examined in 1992–2002. Leisure-time physical activity was assessed by an interview method, asking about physically demanding activities at leisure time measured in hours. The study sample was pooled into 2 groups: inactive (first quartile) and active (second to fourth quartiles). Follow-up was carried out in terms of the endpoints reached from the baseline until December 31, 2010. Mortality data from the National Death Register were obtained. Results. Multivariate adjusted Cox proportional hazards analyses revealed an HR of 1.46 (95% CI, 1.15–1.85) for all-cause mortality and 1.73 (95% CI, 1.23–2.45) for CVD mortality in the lowest quartile of leisure-time physical activity compared with the higher ones. As much as 16.2% of all-cause mortality and 22.2% of CVD mortality was attributable to the lowest quartile of leisure-time physical activity. Conclusions. This study demonstrated a beneficial effect of leisure time physical activity on predicting all-cause and CVD mortality risk.

2. Ding, Ding; Adams, Marc A.; Sallis, James F.; Norman, Gregory J.; Hovell, Melbourn F.; Chambers, Christina D.; Hofstetter, Richard C.; Bowles, Heather R.; Hagströmer, Maria; Craig, Cora L.; Gomez, Luis Fernando; De Bourdeaudhuij, Ilse; Macfarlane, Duncan J.; Ainsworth, Barbara E.; Bergman, Patrick; Bull, Fiona C.; Carr, Harriette; Klasson-Heggebo, Lena; Inoue, Shigeru; Murase, Norio; Matsudo, Sandra; Matsudo, Victor; McLean, Grant; Sjöström, Michael; Tomten, Heidi; Lefevre, Johan; Volbekienė, Vida; Bauman, Adrian E. Perceived neighborhood environment and physical activity in 11 countries: Do associations differ by country? // International Journal of Behavioral Nutrition and Physical Activity. London: BioMed Central LTD. ISSN 1479-5868. 2013, vol. 10, Article Number 57, p. 1–11. [Impact Factor 3,675]

Background. Increasing empirical evidence supports associations between neighborhood environments and physical activity. However, since most studies were conducted in a single country, particularly western countries, the generalizability of associations in an international setting is not well understood. The current study examined whether associations between
perceived attributes of neighborhood environments and physical activity differed by country. Methods. Population representative samples from 11 countries on five continents were surveyed using comparable methodologies and measurement instruments. Neighborhood environment × country interactions were tested in logistic regression models with meeting physical activity recommendations as the outcome, adjusted for demographic characteristics. Country-specific associations were reported. Results. Significant neighborhood environment attribute × country interactions implied some differences across countries in the association of each neighborhood attribute with meeting physical activity recommendations. Across the 11 countries, land-use mix and sidewalks had the most consistent associations with physical activity. Access to public transit, bicycle facilities, and low-cost recreation facilities had some associations with physical activity, but with less consistency across countries. There was little evidence supporting the associations of residential density and crime-related safety with physical activity in most countries. Conclusion. There is evidence of generalizability for the associations of land use mix, and presence of sidewalks with physical activity. Associations of other neighborhood characteristics with physical activity tended to differ by country. Future studies should include objective measures of neighborhood environments, compare psychometric properties of reports across countries, and use better specified models to further understand the similarities and differences in associations across countries.


This study aims to investigate how teachers’ motivation to teach is related to different teaching styles. A hundred and seventy six physical education teachers from five European countries participated in the study. Teachers’ motivation was measured using an instrument developed by Roth et al. (2007) based on the Self-Determination Theory (Deci and Ryan, 1985) which was tested for suitability for use with physical education teachers. The use of teaching styles was assessed through teachers’ self-reported data according to the description of teaching styles presented by Curtner-Smith et al. (2001). The revised confirmatory factor model of the teachers’ motivation instrument, with three factors, met the criteria for satisfactory fit indices. The results showed that teachers were more intrinsically motivated to teach than externally. Cross-cultural comparison indicated that the Spanish teachers were more intrinsically motivated.
whilst Lithuanian teachers were more externally motivated than teachers from the other four countries. Teachers from all five countries reported a more frequent use of reproductive styles than productive styles. The results of the present study confirmed the hypotheses that teachers’ autonomous motivation is related to the student-centered or productive teaching styles whilst non-autonomously motivated teachers adopt more teacher-centered or reproductive teaching styles. Intrinsic and introjected motivation was significantly higher among teachers who more frequently employed productive teaching styles than teachers who used them less frequently. Intrinsically motivated teachers using more productive teaching styles can contribute more to the promotion physical activity among students.


AIM: The aim of the present study was to examine the disordered eating attitudes and sociocultural body ideals internalization among university athletes (n = 98), exercisers (n = 125) and sedentary (n = 81) undergraduate female students. METHODS: The mean age (SD) of the sample was 20.17 (2.00). The students completed Eating Attitude Test – 26, Body Areas Satisfaction subscale of the Multidimensional Body-Self Relations Questionnaire, Body Shame subscale from the Objectified Body Consciousness Scale, Rosenberg Self-Esteem Scale, Appearance subscale from the Motives for Physical Activity Measure – Revised, reported their physical activity and fluid manipulation – related behaviour.

RESULTS: We observed no significant differences in disordered eating, body dissatisfaction, self-esteem and fluid manipulation – related behaviour among athletes, exercisers and sedentary female students. Body shame predicted disordered eating in all groups of women. Students high in body shame reported higher levels of disordered eating, body dissatisfaction, appearance – related exercise motives, fluid manipulation – related behaviour and lower self-esteem, regardless of their physical activity level.

CONCLUSION: The results show that internalization of the sociocultural body standards provide a mechanism through which different physical activity levels are associated with negative eating and physical activity – related outcomes in college-aged women.

5. Jankauskienė, Rasa; Miežienė, Brigita. Exercise goals as predictors of body image concerns, Social Physique Anxiety and Legal Supplement Use among fitness center...
This study examined how exercise goals predicted body image concerns and the use of supplements in a sample of Lithuanian fitness center exercisers of both genders. Fitness exercisers (n = 238) completed questionnaires measuring exercising goals, body image (BI), social physique anxiety (SPA) and the use of muscle gain (MGS) and weight loss (WLS) supplements. Regression analyses showed that appearance goals of exercising were associated with higher BI concerns and SPA. Relatively intrinsic exercise goals (interest/enjoyment, fitness, and competence) were not associated or negatively associated with BI and SPA. Relatively intrinsic social interaction goals were associated with higher BI and SPA. No differences in BI and SPA between MGS and WLS users versus nonusers were found. Women WLS users demonstrated higher overweight preoccupation. Relatively intrinsic fitness goals were associated with lower MGS use. Competence goals were associated with higher MGS use. Results highlight the importance of understanding the motives of goals and fostering self-determined motivation when preventing body image concerns among exercisers.


Aim: The study aim was to establish the threshold of stretching volume for flexibility enhancement during physical education lessons in secondary school children. Methods: Subjects were 239 tenth grade children randomly assigned to four groups (boys 107, girls 132, mean age 15.1 ± 0.4). Children 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 five weeks comprising 10 physical education lessons. Flexibility was determined from sit and reach test before and after intervention. Subjects in group 1 performed standard “sit and reach” test of four trials in every physical education lesson; in group 2 received one stretching exercise of four repetitions; group 3 received four stretching exercises of four repetitions; in group 4 no stretching was performed. Results: Flexibility improvement in group 3 were the greatest (21.6%; p < 0.05), smaller in group 2 (12.6%, p < 0.05) and smallest in 1 group (5.1%, p < 0.05), while control group changes were insignificant (1.7%, p > 0.05). Conclusion: The main finding was that single flexibility test performed twice a week for five weeks was sufficient stimulus to increase range of motion in secondary school children. Stretching exercises provides exceptional prospects to achieve youths’ improvement since schoolchildren are very sensitive to flexibility training.

This descriptive study examined perceived characteristics aggressiveness in male adolescent athletes and nonathletes aged 14 to 16. The analysis covered 150 male adolescents practicing various sports and 150 male adolescent nonathletes. Two surveys were used in this study: Assinger’s questionnaire for the identification of the attitudes to aggression and the questionnaire developed by Buss and Perry for the evaluation of forms of aggressiveness, i.e. at the analysis of physical aggression, verbal aggression, anger and hostility. Nonathletes had more positive attitudes toward aggression than athletes. Nonathletes were less verbally aggressive than athletes. Non-contact athletes were less verbally aggressive than combat athletes, contact athletes, and nonathletes. Non-athletes were less angry than athletes. Also it turned out that combat athletes were the angriest group. Athletes and nonathletes did not differ significantly on physical aggression and hostility, although a breakdown showed that contact athletes score higher than noncontact athletes on both measures.


To investigate the relationships between personality traits and athletic capacity, this study compared a sample of 376 young adult men (169 athletes, 207 non-athletes; M age = 23.8 yr., SD = 3.9). 26 lab-based exercise capacity parameters were measured, as well as the Big Five major personality traits using the NEO Five-Factor Inventory. The results indicated that athletes scored higher than nonathletes for Conscientiousness but scores were not statistically different between groups for other personality traits. Team sport athletes scored higher on Extraversion than endurance athletes. All the personality traits were associated with some of the exercise capacity indices; however, these correlations were rather weak (r s < .2).

The linkage between mood states and unhealthy food consumption has been under investigation in recent years. This study aimed to evaluate the associations between posttraumatic stress (PTS) symptoms after lifetime traumatic experiences and daily unhealthy food consumption among adolescents, taking into account the possible effects of physical inactivity, smoking, and a sense of coherence. A self-administered questionnaire measured symptoms of PTS, lifetime traumatic experiences, food frequency scale, sense of coherence scale in a representative sample of eighth grade pupils of the Kaunas, Lithuania, secondary schools (n = 1747; 49.3% girls and 50.7% boys). In the logistic regression models, all lifetime traumatic events were associated with PTS symptoms, as well as were unhealthy foods, (including light alcoholic drinks, spirits, soft and energy drinks, flavored milk, coffee, fast food, chips and salty snacks, frozen processed foods; excluding sweet snacks, biscuits and pastries) and sense of coherence weakened the strength of the associations. However, physical inactivity and smoking showed no mediating effect for the majority of unhealthy foods. In conclusion, we found that intervention and preventive programs on PTS symptoms may be beneficial while dealing with behavioral problems (unhealthy diet, smoking, alcohol, physical inactivity) among adolescents.


This study examined links between parents’ exercise habits and adolescents’ participation in sports activities, considering the aspects of gender and age. It was hypothesized that regular exercise by both parents would be related to children’s involvement in sport regardless of their gender and age. Moreover, it was hypothesized that children’s sports activities would be more strongly related to their father’s exercise activities. The study also examined the links between parents’ exercise habits and children’s motivation for sports. It was hypothesized that competition motives would be more important for children whose parents exercised regularly. The research sample included 2335 students from the seventh (n = 857), ninth (n = 960) and eleventh (n = 518) grades of various Lithuanian schools. The study used a questionnaire survey method, which revealed the links between parents’ exercise habits and their children’s participation in sport. Assessment of data for girls and boys showed that daughters’ participation in sport could be predicted by both their fathers’ and mothers’ exercise habits, but sons’ sports activities could be predicted only by the regular physical activities of their fathers. The assessment of children’s sporting activities according to age revealed links between parental exercising and the
engagement of older (15–16 years old), but not younger adolescents (13–14 years old). Analysis of sports motivation showed that competition motives were more important for boys than for girls. Fitness, well-being and appearance motives were more important for older adolescents (15–18 years old), while competition motives were more important for younger adolescents (13–14 years old). Research revealed the relationship between children’s sport motives and fathers’ exercise habits, while examination of mothers’ exercise revealed no difference.

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35. Tumynaitė, Laura; Miezienė, Brigita; Mok, Magdalena Mo Ching; Chin, Ming-kai; Putriūtė, Vitalija; Rupainienė, Virginija; Stankevičienė, Giedrė; Emeljanovas, Arūnas. Effects of intervention “HopSport Brain Breaks” program on physical fitness and sedentary behaviour in primary school // Ugdymas. Kūno kultūra. Sportas = Education. Physical Training. Sport. Kaunas: Lietuvos sporto universitetas. ISSN 2351-6496. 2014, Nr. 3 (94), p. 57–66.


Most significant “3”


Top “10”


In order to organize a sport event it is necessary for the organizers to assess properly its economic contribution. Without the assessment of the sport event contribution the reasoning of the event’s budget becomes complicated, unless not economical, but political criteria of the event
organization are followed exclusively. An economic contribution of the sport event interests not only practitioners, i.e., organizers of sports events, but also the scientists of economics. The aim of the article is to assess the economic contribution of the sport event. In the assessment of economic contribution it is important to evaluate the legacy of sport event. Namely because of this aspect the problem of assessment of the economic contribution of sport event appears, since the expenses when the event is organized are felt before it and during the event, and economic contribution and legacy of the sport event may occur after it is over. In the article also direct and indirect impact of Eurobasket 2011 on the economy was assessed, however it is necessary to consider also the legacy of sport event, i.e., the use of sports arenas in the future. Reffering to the experience of the Eurobasket 2011 organizers the possibilities of basketball championship improvement are identified in the article. The first possibility is the increase of investments made by the sport event organizers into the communication regarding the higher attraction of foreign fans. One more possibility would be the governmental legislative-taxing concessions for the promotion of international events. And also an international organization of the sport event by collecting a higher event tax would transfer more marketing rights for a local organizer.


The research goal of the article is to evaluate the quality of services in fitness centres in Kaunas. For the aim of the article to be achieved, the authors strive to determine the applicability of service quality assessment models for the evaluation of service quality in fitness centres, to analyze the findings of underlying research referring to the quality of services in fitness centres And to determine the quality of services in fitness centres in Kaunas from the customer’s standpoint. SERVQUAL, SQAS and QUESC models were selected as the most suitable models to measure the quality of services in fitness centres. These models have specific quality criteria that can be used to evaluate the quality of services in fitness centres. The models are supplementary and provide information for the improvement of service quality and building customer loyalty. The analysis of questionnaires used for the evaluation of services revealed that the quality of services did not exceed customers’ expectations and the needs of fitness centres customers were not met. However, the difference between the expected and received quality was insignificant and the customers regarded the quality of services in fitness centres as acceptable.
Today, only modern organizations can compete in the national, European and global market, as they develop knowledge, or use of scientific and technical progress in modernizing jobs, basically increasing productivity, reducing production costs, the staff is regularly taught new ways of working, developing co-operation in the national and the international market, they are able to adapt to the constantly changing environment. Aim of article was to identify the main factors affecting the competitiveness of services of sports clubs. The paper identifies major internal and external factors influencing the competitiveness of the services provided by sports clubs. Internal factors were factor and demand conditions, related and servicing industries (clusters), the company structure, strategy and competition, manager/strategy developer, corporate image and service quality. External factors were the role of the government, opportunities and international business, social and economic factors. The main reasons for the importance of internal factors affecting the competitiveness of sports club services are the clients’ personal interests and meeting their social needs, and the importance of the external factors is determined by the state and the values established in the society. The practical model of factors affecting the competitiveness of the services provided by sports clubs was developed in the order of their priority. The model of factors affecting the competitiveness of the services provided by sports clubs reflects the internal and external competitive environment of sports clubs services.

The quality of higher education is predominantly determined by the work of academic staff and organization of instructional process; the criteria of higher education institution’s infrastructure are of moderate importance. Professional qualities of teaching staff that are related to communication with students during lectures are important for quality assurance; effective communication with others was found to be the most important personal quality of teaching staff. Professional
qualities were evaluated as being more important than personal ones. The most effective teaching methods important to the quality of higher education are different types of group work in the classroom. In general, the teaching and learning methods used in delivering Sport and Tourism Management study programme were rated as effective. The following properties of learning materials used in Sport and Tourism Management study programme received the highest evaluation: information links to specialty, suitability, and applicability of theoretical knowledge in practice. The objective of the research is to diagnose and evaluate criteria that assure the quality of Sport and Tourism Management study programme. The main tasks set for the research were: to review the concept of the quality of higher education and aspects of its evaluation from the theoretical point of view; to discuss the general quality assurance criteria from the theoretical point of view; to evaluate the criteria that determine the quality of teaching and learning in Sport and Tourism Management study programme. The object of the research is to establish criteria that determine the quality of teaching and learning in Sport and Tourism Management study programme. The problem of the research is to find criteria that assure the quality of teaching and learning in Sport and Tourism Management study programme.


The article analyzes influence of human resource assessment to organization’s climate. There is a theoretical model of influence of human resource assessment to organization’s climate reasoned and its empirical verification performed in the article. For the reasoning of the model there was used a literature that describes a phenomenon of human resource assessment and allows penetrating of connection with organizational climate in its conception. As there was a phenomenological research performed, while examining the phenomenon it was likely this phenomenon shows up in these organizations. By this study there was a striving to gather as much information on influence of human resource assessment to organization’s climate as possible; therefore there were purposefully studied big organizations of public sector in Lithuania, in which this phenomenon exists. Assessment of human resources in the article is analyzed as a process. It is represented by eighty five questions that were joined together by the help of factor analysis and reliability analysis into five essential stages of human resource assessment during the process: assessment methodology, organization of assessment, assessors of employees, informational sources and discussion on assessment. By using methodology of questionnaire
there was analyzed an influence of process stages mentioned to additive construct of organization’s climate which is constructed of thirty nine primary items. This allowed knowing properly organizational climate and constructing of index of wide range organizational climate. Data were processed using the method of one-dimensional regression because it allowed assessment of every connection separately and thus knowing better a phenomenon of influence of assessment of human resources to organization’s climate. Findings showed that all process from methodology of assessment to discussion influences organizational climate. The article presents an empirical model of influence of assessment of human resources to organization’s climate, which figures structurally a connection between assessment of human resources and organizational climate that shows up in big organizations of Lithuanian public sector. The article is original because the study it described allowed envisaging which stages of human resource assessment process influence organization’s climate directly and which are influencing through mediators. The study is restricted by the fact that assessors of employees in the organizations studied were only external. This is confirmed by position of this feature in the model created.


After analyzing the transformations in Lithuanian and Ukrainian economy, the integrated regional policies effect to regional differences development evaluation methodology was prepared, which is designed to link regional developments with regional policies. The purpose of the article is to present a common Lithuanian – Ukrainian assessment methodology developed in the scientific study, which ensures the objectivity and applicability to solve regional development issues. Summarizing the variety of development level indicators in the scientific literature and experience of Lithuania and Ukraine, four main groups of indicators are identified in this paper that accurately describe the socio-economic situation: demographic, social and economic development and labor market, assessed region’s transportation systems and social and tourism availability, compared public infrastructure and services development indicators. Analysis of scientific literature, Lithuanian and Ukrainian experience, statistical data analysis, and expert evaluations carried out in both countries created a joint region competitiveness evaluation system. Performed evaluation of expert opinion consensus enabled to select the indicators of region’s development level evaluation and their combinations, which are necessary
to carry out inter-regional comparisons. The article also contains structure graph, dedicated to indicate the consistency in the execution of the evaluation process and opportunities of use of research data analysis methods to implemented regional policies development impact to region development deficiencies calculation. The findings of the article show that the effects of implemented measures of regional policy can be evaluated only in a few years by adding investment in business, human resources, infrastructure development, but it must be done periodically to monitor regional social-economic development processes and the effectiveness of regional policy changes.


Purpose. The main purpose of this article is to survey and analyze the paradigm of complex dynamic systems (CDSs) and the possibility of applying them in the management of social systems, because the CDS perspective is taking its maiden steps in this field, whereas it already has widespread support in physics, biology, and even philosophy. Design / methodology / approach. A systematic and logical analysis of the CDS paradigm, the differences between physical, biological, social, and humanitarian systems, and the changes in the philosophy of systems are described in the paper. Findings. This paper and the published studies reported are the first to show that the CDS paradigm is undoubtedly not a fashion but a necessity, if we are to manage social systems more efficiently. Originality / value. This paper is a first attempt to analyze CDSs and the possibility of applying them in the management of social systems.


Environmental pressure from residential energy use is projected to significantly increase by 2030. Different environmental policy measures provide different incentives for “environmentally responsive” consumer choices and behavioural responses. There is a great energy saving potential in residential buildings of Lithuania. Compared to the other EU countries with similar climate conditions, energy consumption for residential heating is approximately 1.8 times higher in Lithuania. About 60% of Lithuanian population resides in multi-apartment buildings
constructed during 1961–1990. The aim of the paper is to define the main drivers of residential energy use in Lithuania and to compare energy saving technologies in terms of energy saving potential and costs in Lithuanian residential buildings. Seeking to achieve the aim the main tasks of the paper are to analyse theoretical issues of the main drivers of residential energy use; to analyse residential energy use trends in Lithuania and to compare these trends with other EU member states; to define the main drivers of residential energy use by applying correlation analysis; to analyse policies aiming to reduce energy consumption in residential buildings and their impacts on GHG emission reduction. The comparative study of residential energy use in Lithuania and several old EU member states showed that residential energy use per capita in Lithuania is significantly lower than in old EU member states because of the lower income per capita and lower living standards. The economic and technological factors are the main driving forces of final energy consumption in all compared EU member states; however the impact of different factors varies between countries. The comparative analysis of energy saving and GHG emission reduction potential and costs in residential buildings provided by different studies showed that the most cost-effective instruments were appliance standards, energy efficiency obligations, Demand Side Management programs, public benefit charges and labelling.


A learning organization is an organization that attends to the ability of individuals to participate in a continuous learning process and ensure flexible and effective adaptation to changes. Positive response to changes is one of the ways to ensure successful operation and therefore learning organizations become the leading companies. They experiment more and encourage their members to be innovative. So, the modern society and modern organizations are focused on an ongoing change. The change in needs and wishes is especially felt by service companies because the quality of services is perceived individually and is subject to personal needs and wishes of each customer. The success of companies providing other than essential services, such as a tourism organization, depends on the ability to adapt and learn. Recently great attention has been paid to the improvement of organizational performance and the transformation of a traditional organization into a learning organization is seen as one of the possibilities for better performance. It has been generally accepted that correct learning of the organization is a key factor that ensures a rapid improvement of the organization and a quick
response to the changing environment. Presumably, organizational learning is very important for a tourism company. Firstly, the environment in this sector undergoes constant changes; the sector develops rapidly and offers new products to the market. Secondly, the employees of a tourism company maintain regular relations with the end-users of the services and therefore a big number of tourism company’s employees have access to external sources of learning.


Corporate social responsibility (CSR) is the dimension of society’s development, expressing the values, constituting the basis of the perception of sustainability of relations between organisations and society in real life. The development of the private sector in Lithuania relied on the principles of free market, rather than on the principles of social market. This sets additional tasks in pursuance of a broader practical development of corporate social responsibility, which is significantly influenced by scientific insights and research. To achieve the aim, the aspects of theoretical research on corporate social responsibility in the Lithuanian studies on the topic are discussed with the purpose to form guidelines for broader future research. Assessing empirical research in private and public sector organisations in Lithuania, focused on social responsibility, the threats posed by the lack of integral development of social responsibility are distinguished. It is stated that the scientific thought in this case should become the coordinating factor for a wider three-party social-organisation individual discussion; therefore, theoretical and empirical studies should focus on this relationship, with the view of axiological congruence as the point of contact, which could accelerate social responsibility innovations. When carrying out empirical research in Lithuania, private and public capital should be methodologically distinguished, since the latter provides the obligation to serve the public interest, which is a conceptual opposite to profit maximisation. Based on these positions, it would be meaningful to assess in further studies how the earnings of the public sector managed enterprises are generated and used in the context of social responsibility.
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Seynnes, Olivier R.; Kamandulis, Sigitas; Kairaitis, Ramutis; Helland, Christian; Campbell, Emma-Louise; Brazaitis, Marius; Skurvydas, Albertas; Narici, Marco V. Effect of androgenic-anabolic steroids and heavy strength training on patellar tendon morphological and mechanical properties // Journal of Applied Physiology. Bethesda: American Physiological Society. ISSN 8750-7587. 2013, vol. 115, issue 1, p. 84–89. [Impact Factor 3,434]

Top “10”

1. Brazaitis, Marius; Eimantas, Nerijus; Daniusevičiūtė, Laura; Baranauskienė, Neringa; Skrodenienė, Erika; Skurvydas, Albertas. Time course of physiological and psychological responses in humans during a 20-day severe-cold-acclimation programme // PLOS ONE. San Francisko: Public Library Science. ISSN 1932-6203. 2014, vol. 9, issue 4, p. 1–12. [Impact Factor 3,534]
The time course of physiological and psychological markers during cold acclimation (CA) was explored. The experiment included 17 controlled (i.e. until the rectal temperature reached 35.5°C or 170 min had elapsed; for the CA-17 session, the subjects (n = 14) were immersed in water for the same amount of time as that used in the CA-1 session) head-out water immersions at a temperature of 14°C over 20 days. The data obtained in this study suggest that the subjects exhibited a thermoregulatory shift from peripheral-to-central to solely central input thermoregulation, as well as from shivering to non-shivering thermogenesis throughout the CA. In the first six CA sessions, a hypothermic type of acclimation was found; further CA (CA-7 to CA-16) led to a transitional shift to a hypothermic–insulative type of acclimation. Interestingly, when the subjects were immersed in water for the same time as that used in the CA-1 session (CA-17), the CA led to a hypothermic type of acclimation. The presence of a metabolic type of thermogenesis was evident only under thermoneutral conditions. Cold-water immersion decreased the concentration of cold-stress markers, reduced the activity of the innate immune system, suppressed specific immunity to a lesser degree and yielded less discomfort and cold sensation. We found a negative correlation between body mass index and Δ metabolic heat production before and after CA.


Here, we address the question of why some people have a greater chance of surviving and/or better resistance to cold-related-injuries in prolonged exposure to acute cold environments than do others, despite similar physical characteristics. The main aim of this study was to compare physiological and psychological reactions between people who exhibited fast cooling (FC; n = 20) or slow cooling (SC; n = 20) responses to cold water immersion. Individuals in whom the Tre decreased to a set point of 35.5°C before the end of the 170 min cooling time were indicated as the FC group; individuals in whom the Tre did not decrease to the set point of 35.5°C before the end of the 170-min cooling time were classified as the SC group. Cold stress was induced using intermittent immersion in bath water at 14°C. Motor (spinal and supraspinal reflexes, voluntary and electrically induced skeletal muscle contraction force) and cognitive (executive function, short term memory, short term spatial recognition) performance, immune variables (neutrophils, leucocytes, lymphocytes, monocytes, IL-6, TNF-α), markers of hypothalamic–pituitary–adrenal axis activity
(cortisol, corticosterone) and autonomic nervous system activity (epinephrine, norepinephrine) were monitored. The data obtained in this study suggest that the response of the FC group to cooling vs the SC group response was more likely an insulative–hypothermic response and that the SC vs the FC group displayed a metabolic–insulative response. The observations that an exposure time to 14°C cold water – which was nearly twice as short (96 min vs 170 min) with a greater rectal temperature decrease (35.5°C vs 36.2°C) in the FC group compared with the SC group – induces similar responses of motor, cognitive, and blood stress markers were novel. The most important finding is that subjects with a lower cold-strain-index (SC group) showed stimulation of some markers of innate immunity and suppression of markers of specific immunity.


Introduction: In this study, we questioned whether local cooling of muscle or heating involving core and muscle temperatures are the main indicators for force variability. Methods: Ten volunteers performed a 2 min maximum voluntary contraction (MVC) of the knee extensors under control (CON) conditions after passive heating (HT) and cooling (CL) of the lower body. Results: HT increased muscle and rectal temperatures, whereas CL lowered muscle temperature but did not affect rectal temperature. During 2-min MVC, peak force decreased to a lower level in HT compared with CON and CL experiments. Greater central fatigue was found in the HT experiment, and there was less in the CL experiment than in the CON experiment. Conclusions: Increased core and muscle temperature increased physiological tremor and the amount and structural complexity of force variability of the exercising muscles, whereas local muscle cooling decreased all force variability variables measured.

4. Gorianovas, Giedrius; Skurvydas, Albertas; Streckis, Vytautas; Brazaitis, Marius; Kamandulis, Sigita; McHugh, Malachy P. Repeated bout effect was more expressed in young adult males than in elderly males and boys // BioMed Research International (Journal of Biomedicine and Biotechnology). New York: Hindawi Publishing. ISSN 2314-6133. 2013, vol. 2013, Article ID 218970, p. 1–10. [Impact Factor 2.706]

This study investigated possible differences using the same stretch-shortening exercise (SSE) protocol on generally accepted monitoring markers (dependent variables: changes in creatine
kinase, muscle soreness, and voluntary and electrically evoked torque) in males across three lifespan stages (childhood versus adulthood versus old age). The protocol consisted of 100 intermittent (30 s interval between jumps) drop jumps to determine the repeated bout effect (RBE) (first and second bouts performed at a 2-week interval). The results showed that indirect symptoms of exercise-induced muscle damage after SSE were more expressed in adult males than in boys and elderly males, suggesting that the muscles of boys and elderly males are more resistant to exercise-induced damage than those of adult males. RBE was more pronounced in adult males than in boys and elderly males, suggesting that the muscles of boys and elderly males are less adaptive to exercise-induced muscle damage than those of adult males.


Gymnastics, a high-impact weight-bearing physical activity, has been shown to be highly osteogenic. Previously in this cohort, bone mass development (bone mineral content accrual [BMC]) was shown to be positively associated with low-level (recreational) gymnastics exposure (1 to 2 hours per week); however, BMC is only one single component of bone strength. Bone strength is influenced not only by bone mineralization but also bone geometry, bone architecture, and the imposing loads on the bone. The aim of this study was to investigate whether low-level gymnastics training influenced the estimated structural geometry development at the proximal femur. A total of 165 children (92 gymnasts and 73 non-gymnasts) between the ages of 4 and 6 years were recruited into this study and assessed annually for 4 years. During the 4 years, 64 gymnasts withdrew from the sport and were reclassified as ex-gymnasts. A dual-energy X-ray absorptiometry (DXA) image of each child’s hip was obtained. Values of cross-sectional area (CSA), section modulus (Z), and cortical thickness (CT) at the narrow neck (NN), intertrochanter (IT), and shaft (S) were estimated using the hip structural analysis (HSA) program. Multilevel random-effects models were constructed and used to develop bone structural strength development trajectories (estimate ± SEE). Once the confounders of body size and lifestyle were controlled, it was found that gymnasts had 6% greater NN CSA than non-gymnasts controls (0.09 ± 0.03 cm (2), p < 0.05), 7% greater NN Z (0.04 ± 0.01 cm (3), p < 0.05), 5% greater IT CSA (0.11 ± 0.04 cm (3), p < 0.05), 6% greater IT Z (0.07 ± 0.03 cm (3), p < 0.05), and 3% greater S CSA (0.06 ± 0.03 cm (3), p < 0.05). These results suggest that early exposure to low-level gymnastics participation
confers benefits related to geometric and bone architecture properties during childhood and, if maintained, may improve bone health in adolescence and adulthood.


PURPOSE: To compare the concomitant treatment of articular cartilage damage in the medial femoral condyle with osteochondral autologous transplantation (OAT), microfracture, or debridement procedures at the time of anterior cruciate ligament (ACL) reconstruction. METHODS: Between 2006 and 2009, 102 patients with a mean age of 34.1 years and with an ACL rupture and articular cartilage damage in the medial femoral condyle of the knee were randomized to undergo OAT, microfractures, or debridement at the time of ACL reconstruction. A matched control group was included, comprising 34 patients with intact articular cartilage at the time of ACL reconstruction. There were 34 patients in the OAT-ACL group, 34 in the microfracture (MF)-ACL group, 34 in the debridement (D)-ACL group, and 34 in the control group with intact articular cartilage (IAC-ACL group). The mean time from ACL injury to operation was 19.32 ± 3.43 months, and the mean follow-up was 36.1 months (range, 34 to 37 months). Patients were evaluated with the International Knee Documentation Committee (IKDC) score, Tegner activity score, and clinical assessment. RESULTS: Of 102 patients, 97 (95%) were available for the final follow-up. According to the subjective IKDC score, all 4 groups fared significantly better at the 3-year follow-up than preoperatively (p < .005). The OAT-ACL group’s IKDC subjective knee evaluation was significantly better than that of the MF-ACL group (p = .024) and D-ACL group (p = .018). However, the IKDC subjective score of the IAC-ACL group was significantly better than the OAT-ACL group’s IKDC evaluation (p = .043). There was no significant difference between the MF-ACL and D-ACL groups’ IKDC subjective scores (p = .058). Evaluation of manual pivot-shift knee laxity according to the IKDC knee examination form showed similar findings for the 4 groups immediately postoperatively and at 3-year follow-up, and the findings were rated as normal or nearly normal (IKDC grade A or B) in 29 of 33 patients (88%) in the OAT-ACL group, 28 of 32 patients (88%) in the MF-ACL group, 27 of 32 patients (84%) in the D-ACL group, and 31 of 34 patients (91%) in the IAC-ACL group. CONCLUSIONS: Our study shows that intact articular
cartilage during ACL reconstruction yields more favorable IKDC subjective scores compared with any other articular cartilage surgery type. However, if an articular defect is present, the subjective IKDC scores are significantly better for OAT versus microfracture or debridement after a mean period of 3 years. Anterior knee stability results were not significantly affected by the different articular cartilage treatment methods.

7. Seynnes, Olivier R.; Kamandulis, Sigitas; Kairaitis, Ramutis; Helland, Christian; Campbell, Emma-Louise; Brazaitis, Marius; Skurvydas, Albertas; Narici, Marco V. Effect of androgenic-anabolic steroids and heavy strength training on patellar tendon morphological and mechanical properties // Journal of Applied Physiology. Bethesda: American Physiological Society. ISSN 8750-7587. 2013, vol. 115, issue 1, p. 84–89. [Impact Factor 3,434]

Combined androgenic-anabolic steroids (AAS) and overloading affects tendon collagen metabolism and ultrastructure and is often associated with a higher risk of injury. The aim of this prospective study was to investigate whether such effects would be reflected in the patellar tendon properties of individuals with a history of long-term resistance training and AAS abuse (RTS group), compared with trained (RT) and untrained (CTRL) nonsteroids users. Tendon cross-sectional area (CSA), stiffness, Young’s modulus, and toe limit strain were measured in vivo, from synchronized ultrasonography and dynamometry data. The patellar tendon of RT and RTS subjects was much stiffer and larger than in the CTRL group. However, stiffness and modulus were higher in the RTS group (26%, p < 0.05 and 30%, p < 0.01, respectively) than in the RT group. Conversely, tendon CSA was 15% (p < 0.05) larger in the RT group than in RTS, although differences disappeared when this variable was normalized to quadriceps maximal isometric torque. Yet maximal tendon stress was higher in RTS than in RT (15%, p < 0.05), without any statistical difference in maximal strain and toe limit strain between groups. The present lack of difference in toe limit strain does not substantiate the hypothesis of changes in collagen crimp pattern associated with AAS abuse. However, these findings indicate that tendon adaptations from years of heavy resistance training are different in AAS users, suggesting differences in collagen remodeling. Some of these adaptations (e.g. higher stress) could be linked to a higher risk of tendon injury.

8. Sipavičienė, Saulė; Daniusevičiūtė, Laura; Klizienė, Irina; Kamandulis, Sigitas; Skurvydas, Albertas. Effects of estrogen fluctuation during the menstrual cycle on the response to stretch-shortening exercise in females // BioMed Research International
The aim of this study was to investigate whether variation in estrogen levels during the menstrual cycle influences susceptibility to exercise-induced muscle damage after stretch-shortening cycle exercise. Physically active women (n = 18; age = 20.2 ± 1.7 yr) participated in this research. The subjects performed one session of 100 maximal drop jumps on day 1 or 2 of the follicular phase and another identical session on day 1 or 2 of the ovulatory phase; the order of the sessions was randomized. Quadriceps femoris muscle peak torque evoked by electrical stimulation and maximal voluntary contraction, muscle pain, and CK activity were measured before and at various times up to 72 h after exercise. It was found that the high estrogen level during the ovulatory phase might be related to an earlier return to baseline muscle strength after strenuous stretch-shortening cycle exercise in that phase compared with the follicular phase. The estrogen effect appears to be highly specific to the damaged site because the differences in most EIMD markers (CK, soreness, and low-frequency fatigue) between the two menstrual cycle phases were small.

9. Solianik, Rima; Skurvydas, Albertas; Vitkauskienė, Astra; Brazaitis, Marius. Gender-specific cold responses induce a similar body-cooling rate but different neuroendocrine and immune responses // Cryobiology. San Diego: Elsevier Science. ISSN 0011-2240. 2014, vol. 69, issue 1, p. 26–33. [Impact Factor 1,643]

This study investigated whether there are any gender differences in body-heating strategies during cold stress and whether the immune and neuroendocrine responses to physiological stress differ between men and women. Thirty-two participants (18 men and 14 women) were exposed to acute cold stress by immersion to the manubrium level in 14°C water. The cold stress continued until rectal temperature (\(T_{\text{RE}}\)) reached 35.5°C or for a maximum of 170 min. The responses to cold stress of various indicators of body temperature, insulation, metabolism, shivering, stress, and endocrine and immune function were compared between men and women. During cold stress, \(T_{\text{RE}}\) and muscle and mean skin temperatures decreased in all subjects (\(p < 0.001\)). These variables and the \(T_{\text{RE}}\) cooling rate did not differ between men and women. The insulative response was greater in women (\(p < 0.05\)), whereas metabolic heat production and shivering were greater (\(p < 0.05\)) in men. Indicators of cold strain did not differ between men and women, but men exhibited larger changes in the indicators of neuroendocrine (epinephrine level) and in immune (tumor necrosis factor-α level) responses (both \(p < 0.05\)).
results of the present study indicated that men exhibited a greater metabolic response and shivering thermogenesis during acute cold stress, whereas women exhibited a greater insulative response. Despite the similar experience of cold strain in men and women, the neuroendocrine and immune responses were larger in men. Contrary to our expectations, the cooling rate was similar in men and women.


There is a lack of data on fatigue changes within 24 h among patients with multiple sclerosis. The purpose of this study was to evaluate the effect of time of day on central and peripheral fatigue during a continuous 2 min maximal voluntary contraction of the quadriceps muscle in women and men with multiple sclerosis (MS). We studied age-matched MS patients (range, 40–50 years). The inclusion criteria for patients were: a Kurtzke Expanded Disability Status score and a Fatigue Severity Scale score. We found a significant gender difference in central activation ratio (CAR) in the evening. At the end of the 2 min maximal voluntary contraction (MVC), the voluntary torque decreased by about 65% in men and women with MS in both the morning and evening. We also observed that, in women, CAR decreased markedly during the first 30 s in the evening test. The most interesting finding of our study is that central fatigue increased, whereas peripheral fatigue decreased markedly in the evening only in women. It remains unclear why women’s central fatigue is greater in the evening than in the morning.

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2014


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PHYSIOLOGICAL AND SOCIAL ASPECTS OF EMPOWERMENT OF DISABLED

Skučas, Kęstutis [Skutshas, K. P.]. Спорт эффективная мера социализации инвалидов // Социологические исследования. Москва: Международная книга. ISSN 0132-1625. 2013, no. 9, p. 149–152. [Impact Factor 0,225]

Most significant

Skučas, Kęstutis [Skutshas, K. P.]. Спорт эффективная мера социализации инвалидов // Социологические исследования. Москва: Международная книга. ISSN 0132-1625. 2013, no. 9, p. 149–152. [Impact Factor 0,225]

На основе социологического исследования в Литве осуществлён анализ возможностей социализации инвалидов, занимающихся и не занимающихся спортом. Возможности социализации обсуждаются на уровне жизненного качества социальных агентов и препятствий для социализации занимающихся и не занимающихся спортом.

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