Józef Piłsudski University of Physical Education in Warsaw,
University College in Biala Podlaska, Poland

THE 16TH CONFERENCE OF BALTIC SOCIETY OF SPORT SCIENCES "CURRENT TRENDS IN SPORTS SCIENCES AND PHYSICAL EDUCATION"

Programme and Abstracts

May 24-25th, 2023
Biała Podlaska, Poland

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CONFERENCE PROGRAMME

Patronat honorowy

16TH CONFERENCE OF BALTIC SOCIETY OF SPORT SCIENCES

"CURRENT TRENDS IN SPORT SCIENCES AND PHYSICAL EDUCATION"

Wednesday 24th May

18:00 - 21:00	**Welcoming Reception** (Roskosz Manor and Park Complex*)

Thursday 25th May

8:30 - 9:30	**Reception desk**
9:30 - 9:45	**Opening ceremony** – Auditorium
9:45 - 11:15	**1st Plenary session** (Chair: Juris Grants, Paweł Tomaszewski)
9:45	**Duarte Araujo** – *The ecological dynamics of skill learning in sport*
10:15	**Jarek Mäestu** – *Internal load as marker for training monitoring in endurance sports*
10:45	**Hubert Makaruk** – *The FUS test as an assessment tool for learning*
11:15 - 11:30	**Coffee break** (3nd floor)
11:30 - 14:00	**1st Session**
	Auditorium – **Physical Education and Sports Performance** (Chair: Emilo Fernadez-Rodriguez, Tomasz Niźnikowski)
11:30	*A behavioral, neurophysiological, and psychological investigation of extended motor skill practice in VR* – Markwell L.
11:40	*Multidimensional model of mental toughness and general self-efficacy of athletes for increase performance in sports* – Astafičevs A., Vazne Ž., Fernāte A.
11:50	*Physical education teachers' and sports coaches' value orientation* – Fernāte A., Vazne Ž.
12:00	*Blood metabolic responses and changes in marker of muscle damage to tree official strugles in senior female boxers* – Litwiniuk A., Obmiński Z., Maleszewski Z., Grants J., Zajączkowski M.
12:10	*Interdisciplinary analysis of the study process of future sports specialists (sports coaches) in the basics of gymnastics and didactics study programme, creating a link with the dynamic anatomy study process at the Latvian Academy of Sports Education* – Ļubinska I., Smila B., Zvīgule I., Fernāte A., Gulbe A., Bula-Biteniece I.
12:20	*Secular changes in the anthropometric and motor characteristics of Polish female and male university students between 2000 and 2018: Critical approach in context of physical education* – Podstawski R.

12:30	*Self-talk content and performance indicators for young tennis players in competitions (case stady)* – Dzene-Lekse K., Zidens J.
12:40	*What are the effects of adding high-intensity interval training to classical resistance training on the recovery from inactivity-induced leg muscle weakness?* – Brazaitis M., Venckunas T., Snieckus A., Mickevicius M., Eimantas N., Subocius A., Mickeviciene D., Westerblad H., Kamandulis S.
12:50	*Effect of outdoor recreation activity on stress level and mental toughness on Latvian Taekwondo athletes in the competition phase* – Boobani B., Grants J., Boge I., Litwiniuk A.
13:00	*Constructivism in school education: A qualitative systematic review* – Radicuks R., Bula-Biteniece I.
13:10	*Optimising performance: What promotes athletes (adults 22< years old) good performance in the equestrian show-jumping competition?* – Rudmieze S., Fernāte A.
13:20	*Validity and reliability of motorized sprint resistance and assistance device Alex7* – Skujytė A., Lukonaitienė I., Stanislovaitienė J., Šilinskas V., Bradauskienė K., Mamkus G., Kamandulis S.
13:30	*Investigating warm-up strategies in basketball* – Pathadan Titus J., Lukonaitiene I., Pernigoni M., Conte D.
13:40	*Anaerobic performance and balance in young football players* – Sinulingga A.R., Pontaga I.
	Auditorium II – Physical Activity and Health (Chair: Miguel Moreira, Iza Rutkowska)
11:30	*Staying in the comfort zone: 2 years after the COVID-19 lockdown, the physical activity levels of Estonian remote workers might not have recovered* – Argus M., Predbannikova D., Pääsuke M.
11:40	*Post-traumatic stress disorder in Ukrainian people and athletes in war condition* – Korobeinikova I., Kokun O., Raab M.
11:50	*Schoolyard design and physical activity levels of students during outdoor recess in Estonia* – Lemberg G.M., Riso E.M., Fjørtoft I., Kjønniksen L., Kull M., Mäestu E.
12:00	*Modern breathing techniques and their methods of application possibilities for reducing voice and mental fatigue* – Steinmane V.

12:10	*The associations between functional mobility and executive function in older women from Poland: Preliminary study* – Guoping Q., Szumilewicz A., Jażdżewska A., Lipowski M., Wiech M., Radzimiński Ł., Yangjun L., Sawczyn M., Humińska-Lisowska K., Dzitkowska-Zabielska M., Ossowski Z.
12:20	*Gender differences of changing teaching methods under the COVID-19 pandemic for generation „Z" physical activities* – Ciekurs K., Kravalis I., Ropa A.
12:30	*Implementation and evaluation of infant floating model* – Kurmeleva A., Feofilova A.
12:40	*'Conscious 9 months'. Gestational Diabetes Mellitus lifestyle programme combining regular exercise and nutritional intervention: a mixed-method case report* – Makaruk B., Grantham W.
12:50	*Relationships between school personnel's physical activity and children's physical activity attitudes* – Mäestu E., Lemberg G.M., Mägi K., Tilga H., Mooses K., Kull M.
13:00	*Analysis of exercise habits and physical abilities of upper secondary school students* – Purge P., Kurmiste A.
13:10	*Longitudinal development of cardiorespiratory fitness in children in transition from kindergarten to basic school according to participation in organized sports* – Riso E.M., Järvamägi M., Reisberg K., Jürimäe J.
13:20	*Effects of different fasting durations on glucose tolerance in men* – Solianik R., Židonienė K., Eimantas N., Brazaitis M.
13:30	*Implementation and validation of indirect method of muscle aerobic power estimation* – Venckūnas T., Kamandulis S., Šatas A.
14:00 - 15:00	**Lunch time** (3nd floor)
15:00 - 16:30	**2nd Plenary session** (Chair: Diana Reklaitiene, Andrzej Mastalerz)
15:00	**Jared M. Porter** – *Current trends in motor behavior research in the pursuit of expertise development*
15:30	**Agris Liepa** – *Comparison of virtual reality game with 3D headset and online Yoga in improving functional performance, balance and cognitive functioning in seniors – feasibility study*
16:00	**Rūtenis Paulauskas** – *How COVID-19 pandemic changed European basketball competition*
16:30 - 17:00	**Coffee break** (3nd floor)

17:00 - 19:00	**2nd Session**
	Auditorium – Sport and Exercise Science/Kinesiology (Chair: Jarek Mäestu, Logan Markwell)
17:00	*Advancing performance diagnostics in cross country skiers: Implications of incremental exercise test design and analysis* – Bernans E.
17:10	*Impact of specific adaptation in power sports on muscle and tendon function* – Dranevičius G., Lukonaitienė I., Sniečkus A., Mickevičius M., Rutkauskaitė R., Satkunskienė D., Kamandulis S.
17:20	*Effectiveness of enhanced verbal feedback in complex motor skill learning* – Nogal M., Niźnikowski T., Kuśmierczyk P.
17:30	*Shoulder joint adaptation to training in volleyball in young female players* – Pontaga I., Sakne K.E., Liepa A.
17:40	*The impact of the upper body position on the side kick with leg in kickboxing* – Saulite S., Pimenovs E.
17:50	*Unintentional force drifts in the lower extremities* – Zusa A., Rannama I., Latash M.
18:00	*Positive correlation between whole body maximal oxygen uptake and non-invasively (NIRS) measured muscle mitochondrial power* – Venckūnas T., Kamandulis S., Šatas A.
18:10	*The benefits of providing verbal feedback on the key elements of sports technique for motor tasks with a complex movement structure* – Biegajło M., Niźnikowski T., Wiśniowski W.
18:20	*Lower extremity running injuries in Turkish recreational long distance joggers* – Kaçoğlu C.
18:30	*Study of short- and long-term effects of different muscle relaxation techniques on masticatory system muscle tone, function and pain* – Lodaitė M.
20:00 - 23:00	**Gala Dinner** (Roskosz Manor and Park Complex*)

Notes:

Board Meeting of Baltic Society of Sport Sciences – 11:30 - 12:30 (reception desk)

16TH CONFERENCE OF BALTIC SOCIETY OF SPORT SCIENCES

"CURRENT TRENDS IN SPORT SCIENCES AND PHYSICAL EDUCATION"

Friday 26th May

8:00 - 9:45	**Poster Session*** (Chair: Aušra Lisinskiene, Andra Fernate, Janusz Zieliński)
9:00 - 9:45	**Motek GRAIL Workshops** – reception desk
9:45 - 10:00	**Coffee break** (3nd floor)
10:00 - 12:00	**3rd Plenary session** (Chair: Jared Porter, Oscar Romero-Ramos)
10:00	**Miguel Moreira** – *Task description as a key factor to achieve a representative design of the performance context*
10:30	**Rafael Merino Marban** – *Effect on performance of different stretching techniques implemented during warm-up*
11:00	**Daniel Mayorga-Vega** – *Evaluation and promotion of habitual physical activity from Physical Education*
11:30	**Oron Levin** – *Muscle-brain crosstalk*
12:00 - 12:20	**Coffee break** (3nd floor)
12:20 - 14:00	**3rd Session** **Auditorium** – **Social Studies in Sport and Physical Activity** (Chair: Arvydas Stasiulis, Rūtenis Paulauskas)
12:20	*Peripheral vision in basketball players at different level of experience* – Chaliburda A.
12:30	*Autoethnography: researching personal experience in sport and exercise* – Grantham W.
12:40	*Sport brand management of the football league in Latvia – the wishes of fans* – Iļjins A.
12:50	*The Coach-Athlete-Parent (C-A-P) relationship in sports: The importance of the sex, sport type, and family composition* – Lisinskienė A., Lochbaum M.
13:00	*New trends in the selection of literature sources for Bachelor and Master Papers in Sport Science (2006-2022)* – Malahova L., Ropa A.
13:10	*Development of fundamental motor skills across age in Latvia and Poland* – Makaruk H., Grants J., Zieliński J., Bodasińska A., Bula-Biteniece I., Dravniece I., Starzak M., Ciekurs K., Piech K., Makaruk B., Žīdens J., Kalniņš K., Sadowski J.
13:20	*Changes in the somatic structure and motor skills of female students from the Faculty of Physical Education and Health in Biała Podlaska in the years 2015-2021* – Wilczewski A., Wilczewski R., Kuśmierczyk P.

The relationship of physical ability, motivation for physical activity and psychological distress in older people – Jakuboniene R., Mickevičiene D., Mickevicius M., Česnaitienė V.J.

Sitting conditions affect electrical activity of the trunk muscles and brain – Juodzbaliene V., Krasuckiene S., Aleknaite-Dambrauskiene I., Domeika A.

Physical activity among school-aged children's during the COVID-19 pandemic: how it relates to school engagement and learning achievement – Kemeryte-Ivanauskiene E., Česnavičiene J.

Short-term application of kinesiology tape decreases knee pain and improves muscle strength in individuals with complete anterior cruciate ligament rupture – Kielė D., Masiulis N., Solianik R.

Recreational physical activity of elderly people – Kontautiene V., Beniusiene A.

Bibliometric and visualized analysis of exercise and obesity – Letukienė A., Ginevičienė V.

Effects of active breaks with dance on university students – Lobach Y., Romero-Ramos O., Gonzalez A.J., Romero-Ramos N.

The effect of an active break intervention on nonspecific low back pain and musculoskeletal discomfort during prolonged sitting among young people (spine-have&care) – protocol for a randomized controlled trial – Labecka M.K., Plandowska M., Makaruk B., Różańska D., Truszczyńska-Baszak A., Płaszewski M., Rajabi R.

The impact of art therapy on stress and self-esteem experienced by athletes – Mikelionienė G.

Basketball free throw biomechanics: movement variability's impact on throwing accuracy and dynamic stability of the upper limb – Mikelionis T.

The impact durability of a single spine manipulation on posture – Ozols E., Galeja Z.

Nordic walking as a form of a healthy lifestyle and intergenerational and social integration – Parnicka U., Juśkiewicz K., Korpak F., Litwiniuk A., Piech K.

The perception of effort in runners and sedentary prople – Romero-Ramos O., Niźnikowski T., Litwiniuk A., Grants J., Losada-Berlanga M.C.

Is there an influence of selected individual and specific variables on the body balance of children with visual impairment? – Rutkowska I., Rosołek B.

Supporting Ukraine's Olympic sports in hostile conditions – Šarkauskienė A., Agostinis-Sobrinho C., Kuvaldina O.

Effects of manual therapy and home exercise programme on lower back pain – Sipaviciene S.,Pilelis V., Mickevicius M.

Anthropotechnics in sports training and physical education – Skrypko A.

Association between Body Mass Index structure and physical activity, sleep, sedentary behavior, mental health, emotional intelligence – Skurvydas A., Lisinskiene A., Majauskiene D., Valanciene D., Dadeliene R., Istomina N., Sarkauskiene A.

Intangible cultural heritage (ICH) in the context of the student experience – Smuka I., Liepina I.

Barbell velocity in Olympic weightlifting exercises – Szyszka P., Czaplicki A., Sacewicz T.

Identification of ground impacts volleyball players during block – Śliwa M., Czaplicki A., Sacewicz T.

Students preferred activities during outdoor recess – Vaher K., Lemberg G.M., Riso E.M., Kull M., Mäestu E.

Differences in the power feeling of training and non-training tennis players – Waldziński T., Durzyńska A., Niespodziński B., Mieszkowski J., Kochanowicz A.

The relationship between gait speed and risk of falls in postmenopausal women: Preliminary study – Wrzesiński B., Perzanowska E., Guoping Q., Krasowska K., Aschenbrenner P., Szwarc A., Fostiak K., Ossowski Z.

Hamstrings and quadriceps muscle torque ratio in young basketball players – Zidens J., Leja R., Lavins R.

Important information:

- The transport of guests participating in the Welcoming Reception will take place at 17.30 from the main building of the university (all participants).
- Before each session begins, all participants are asked to upload their presentations to the host computer. The title of the file must include the surname of the first author and the title of the presentation.
- Posters will be collected on the reception desk.
- The transport of guests participating in the Gala Dinner will take place at 19.45 from the main building of the university (all participants).
- All participants can use the gym and swimming pool upon presentation of the conference ID.

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MULTIDIMENSIONAL MODEL OF MENTAL TOUGHNESS AND GENERAL SELF-EFFICACY OF ATHLETES FOR INCREASE PERFORMANCE IN SPORTS

Astafičevs A., Vazne Ž., Fernāte A.

Latvian Academy of Sport Education, Riga, Latvia

When an athlete faces difficulties or finds oneself in stressful situations, the result may be determined by the ability to control one's positive and negative emotions. In the scientific literature, mental toughness is described as one of the most widely used but least understood terms in sports psychology. Self-efficacy is an important concept in sports where athletes who want to be successful need to believe in their ability to be successful. In modern sport science, the concept of self – efficacy is one of the more widely studied concepts. This study set out to develop a scientifically substantiated Multidimensional Model of Mental Toughness and General Self-Efficacy of Athletes for Increase Performance in Sports. The sample of respondents consisted of 264 athletes (women and men) aged 18 to 33 years (21 ± 2.96), representing both individual and team sports and with an average of 9.5 ± 0.27 years of experience in sports. The following methods were used to implement the research task: descriptive statistics, factor analysis and modeling. A factoral analysis identified a four – factor structure consisting of "Self-efficacy and purposefulness", "Control", Visuzalization and Positive cognition" and "Self belief" factors. Determining statistically reliable interrelationships between respondents' indicators of mental toughness and general selfefficacy, as well as the established four-factor structure, is the basis for a scientifically argued multidimensional factor model. The developed Multidimensional model of mental toughness and general self-efficacy of athletes for increase performance in sports is a structurally functional model. The model was created based on findings from scientific literature, on the relationship between indicators of mental toughness and general self-efficacy with athlete performance in competitions and improvement in the training process, as well as the results of the factor analysis and statistically significant correlations between the general mental toughness, general self-efficacy and performance of athletes.

Key words: mental toughness, self efficacy, model

ADVANCING PERFORMANCE DIAGNOSTICS IN CROSS COUNTRY SKIERS: IMPLICATIONS OF INCREMENTAL EXERCISE TEST DESIGN AND ANALYSIS

Bernans E.

Latvian Academy of Sport Education, Riga, Latvia

This study aimed to develop a novel laboratory test protocol for cross-country skiers on a treadmill, incorporating incremental intensity loading and rest breaks. Seven experienced cross-country skiers participated in the protocol study using roller skis. Physiological characteristics, including oxygen consumption, heart rate, and lactate concentration, were measured to assess the dynamics of changes in these parameters during the test. The results were analyzed to evaluate the performance diagnostics implications of the new test protocol. It was concluded that the protocol was suitable for assessing relative and maximal performance characteristics of cross-country skiers.

Key words: laboratory test protocol, cross-country skiing, rollerskiing, performance diagnostics

PULSE WAVE PARAMETERS OF RADIAL ARTERY CAN BE HELPFUL TO GET THE FEEDBACK ABOUT THE IMPACT OF WORKLOADS ON BODY SYSTEMS DURING THE TRAINING SESSION

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In accordance with a holistic principle, human body is seen as a complex multi-level functional system, consisting of a large number of interrelated subsystems participating in rhythmic and periodic processes. The problem is based on the idea that the information about the changes in functional state of athletes may present analysis of the pulse wave parameters. The aim of this study was to access feedback information analyzing the dynamics of parameters of pulse wave of radial artery and ECG parameters under the impact of heavy training session. The first study was designed to establish the dynamics of pulse wave parameters while the athletes (n=10) performed the warm-up and after that performed the stepwise incremental exercise up to inability to continue the task. The second study has the task to compare the dynamics of pulse wave parameters and the dynamics of ECG parameters when the group of athletes (n=16) performed hard training session designed to develop muscular power. The recovery of athletes was assessed by the registration the same indices on the next day, i.e. 24 hours after the training session. Arterial blood pressure (ABP) measurements, pulse wave parameters and 12-leads ECG were recoded and analyzed. Pulse is measured at six points on both hands by the computerized devise "PULS-AS". The computer technique of pulse diagnosis is based on the analysis of pulsogram by mutual location of specific points and in comparison with a normalized pulsogram healthy person, showing one graph at beating pulse. This considers the characteristic features of the amplitude and the time shift of these points and deviations from the normalized pulsogram. Computerized system "Kaunas-load" was employed for register of ECG signals. The algebraic data cointegration method was used for analysis of ECG parameters.

Key words: pulse wave parameters, ECG parameters, heavy training session, athletes

IMPACT OF SPECIFIC ADAPTATION IN POWER SPORTS ON MUSCLE AND TENDON FUNCTION

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The explosive sports share similarities, but they also exhibit potentially significant differences in terms of movement speed and reactivity, loading duration and direction, and muscle loading during the eccentric phase. This study aims to compare the tendons and muscles characteristics and neuromuscular performance of explosive sports athletes, including sprinters, long and high jumpers, gymnasts, and karate athletes. The 41 male national elite athletes in track and field sprint and jump events, gymnastics, and karate were assessed using an isokinetic dynamometer to record their maximal knee extension and flexion torques, as well as the electromyography of biceps femoris. Patellar tendon length and cross-sectional area were recorded via ultrasonography while relaxed. Contractile rate force development (RFD) was calculated from the maximal voluntary contraction (MVC) trial, with RFD values determined by averaging the slope of the moment-time curve over intervals of 0-50, 0-100, and 0-200 ms from the onset of contraction. Normalized RFD was calculated up to two-thirds MVC. Kinetic variables of jumps were measured from the best of three countermovement jumps on a force platform. The gymnasts had the highest training experience compared to other athlete groups, but they also had the lowest height and weight ($p < 0.05$).The primary finding was that there were no significant differences in the mechanical characteristics of the patellar tendon among power athletes ($p > 0.05$). However, during isometric testing, the gymnasts had a lower rate of torque development (RTD) compared to the long and high jumpers, but this difference was not observed during the vertical jump test. Furthermore, the jump height and strength of gymnasts were lower than those of track and field athletes ($p < 0.05$). Despite variations in neuromuscular performances and differences in athletic background, the mechanical properties of tendons were comparable among all power sport athletes tested.

Key words: stiffness, rate of torque development, jump height

SELF-TALK CONTENT AND PERFORMANCE INDICATORS FOR YOUNG TENNIS PLAYERS IN COMPETITIONS (CASE STADY)

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Tennis players have many opportunities to experience and demonstrate self-talk in between-point in competition, which can affect competition performance. In the context of psychological preparation, an athlete's ability to influence his self-talk is what differentiates a professional player from an amateur. Previous research reveals that players can gain awareness of their emotional states when they use self-talk, but strategic self-talk can be regulated to improve competitive performance. Uncontrolled negative self-talk affects attention and accuracy, developing a tendency for a negative self talk to dominate and to increase the anxiety level. Therefore, a case study was conducted on a U-16 female tennis player, who has unstable performance in competitions (win, serves). The purpose of the research was to determine self-talk and performance (win/loss) indicators in competitions. The following methods were used in the research: analysis of scientific literature sources, pedagogical observation (competition performance (win/loss), exploring the content of selftalk), survey - questionnaire: ASTQS-LV (Automatic Self-talk Survey for Sports, short version), "Self-Talk Questionnaire" S-TQ - LV, descriptive methods of mathematical statistics, qualitative descriptive methods (coding). The results show that positive automatic self-talk prevails in the matches won, as well as a combination of strategic self-talk, in which motivational self-talk prevailes over instructive self-talk. On the other hand, the matches lost are dominated by negative self-talk, as well as a combination of strategic self-talk dominated by instructive self-talk. This may indicate physical or mental fatigue, choking under pressure or other reasons. Physiological measurements are also needed, which would help clarify the reasons for the choking of the athlete's performance, for example, in the 2nd set. Our study confirms that self-talk affects competition performance and athlete self-efficacy, and also reveals the presence of other performance-influencing factors, such as physical fitness, anxiety assessment.

Key words: self-talk, self-regulation, competition performance

PHYSICAL EDUCATION TEACHERS' AND SPORTS COACHES' VALUE ORIENTATION

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There is a conflict between the roles of physical education teachers' and sports coaches', but both are sport pedagogues. Teaching and coaching are two different occupational roles, but the responsibilities of teachers and sports coaches are to provide acquisition of specific motor skills and promote student or athlete personal development. Physical education teachers and sports coaches are the creators of our next generation, and their values also determine how they will teach and coach. The five most prominent value orientations are in sport pedagogy: disciplinary mastery (DM), learning process (LP), self-actualization (SA), social responsibility (SR), ecological integration (EI). The aim of this research is to investigate the physical education teachers' and sports coaches' value orientation. Participants: 107 PE teachers aged 40 ± 13 years, 49 – men, 58 – women, 106 coaches aged 39 ± 12 years, 60 – men, 46 – women. The following methods were used in the research: the Latvian version of the Questionnaire on Physical Education Teachers' Value Orientations (Chen et al., 1997) and its modification version for coaches; mathematical statistics. The Cronbach's Alpha coefficient of all scales of the questionnaire on physical education teachers' value orientations is .94, which indicates a high alpha value. Variation in dimensions each of the scale's ranges from .766 to .867. The highest indicators in terms of arithmetic mean and standard deviation were 36.37 ± 7.19, α = .774 on physical education teachers' value orientations. LP this dimension ranks second (35.48 ± 7.16; α = .810) in the hierarchy of teachers' value orientations. But the lowest arithmetic mean indicator on physical education teachers' value orientations is in the EI scale 34.11 ± 7.31, α = .772, which indicates that the teacher can maintain a balance between the needs of the person and the group and integrate the socio-cultural goals. The findings of this research are as a basis for improvement the quality of learning and teaching for physical education teachers and sport coaches.

Key words: physical education teachers, sports coaches, pedagogy, value orientations

ASSOCIATION OF IL6 RS1800795 POLYMORPHISM WITH LITHUANIAN TEAM SPORTS PERFORMANCE

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Interleukin 6 (IL-6, encoded by the IL6 gene) was the first myokine that was found to be secreted into the blood stream in response to muscle contractions. IL-6 plasma concentration is affected by exercise duration and intensity. The IL6 rs1800795 (-174G>C) polymorphism is a candidate to explain individual variations in exercise related phenotypes such as athletic performance. This study aimed to investigate whether IL6 rs1800795 genotypes are associated with Lithuanian athletes from various sports. The study involved 191 Lithuanian professional athletes representing three functional sports groups (endurance, n = 64; sprint-power, n = 61, and team sports, n = 66) as well as 205 healthy untrained individuals from the Lithuanian population (control samples). Genotyping was performed using TaqMan real-time polymerase chain reaction assay. The results of this case-control association analysis of IL6 rs1800795 (G/C) revealed statistically significant differences in the group of team sports (a more frequent heterozygous CG genotype was detected) compared to the control group (GG/GC/CC: 16.7%, 66, 7%, 16.7% vs. 35.1%, 43.4%, 21.5%, $p < 0.01$). Binary logistic regression analysis showed that the IL6 GC genotype more than doubled the odds of becoming a professional team sports athlete (OR = 2.6; 95% CI: 1.46-4.67; $p < 0.005$) compared to the control group. Taken together, the findings of this study suggested that IL6 rs1800795 (GC genotype) is associated with athletic performance in team sports (which require the use of both anaerobic and aerobic faculties of energy production). Replication studies are needed to support our data and to fully understand the relationship between IL6 gene and physical performance of athletes.

Key words: myokine, polymorphism, professional athletes

SOFT SKILLS EMPOWERING FOR A SUCCESSFUL CAREER IN TOURISM ADMINISTRATION

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Currently, employers primarily emphasize the significance of the personal and social characteristics of employees and focus less on their professional and business skills. Contrarily, employees often consider deep professional knowledge and skills as their key strengths and pay little attention to personal growth and the development of personal characteristics. The research aim is to compare the soft skills most frequently required by potential employers in job advertisements for the position of administrator to employee soft skills predominantly identified by the students of the Tourism Administration study programme. A study designed to identify employer expectations was conducted in September 2019 and the former study was conducted again in September 2021. To determine the opinions of students in September 2021 a written questionnaire survey of higher education students of the Tourism Administration study programme was conducted. The analysis of comparative qualitative opinions of students and an examination of employer expectations demonstrates that employer expectations regarding the skills of potential employees, especially personal or soft skills, and student opinions regarding skills that have a critical influence on employment and becoming a successful employee, do not always match. The impact of the pandemic created a paradoxical situation in the labour market: before the pandemic, progressively more attention was being paid to employee soft skills. Soft skills were developed, emphasized, and invested in. In the post-pandemic world and the wake of the hybrid way of working in the labour market, not all personal skills remain important.

Key words: tourism, administration, soft skills, career

THE ASSOCIATIONS BETWEEN FUNCTIONAL MOBILITY AND EXECUTIVE FUNCTION IN OLDER WOMEN FROM POLAND: PRELIMINARY STUDY

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The Timed Up and Go (TUG) test could be a simple and commonly used way to assess Functional mobility (FM) in older adults. In several studies, the Trail Making Test (TMT-A; TMT-B) has been extensively used as an indicator of executive function (EF) in older adults. Associations between FM and EF were currently studied in some regions. However, the research on the correlation between FM and EF among elderly women in Poland was limited. Therefore, the objective of this study was to examine whether EF is associated with FM in Polish older women. Sixty-seven women (age between 60 and 85 years) were included in this crosssectional study. FM was evaluated with the TUG test, and EF was assessed using the TMT-A and TMT-B. The TUG was positively correlated with the executive function in TMT-A ($p < 0,05$; $r = 0,23$) and TMT-B ($p < 0,05$; $r = 0,4$) in older women. As far as we know, our study is the first to examine the relationship between FM and EF in older women from Poland. The results showed that FM was positively associated with EF. Due to the limited samples of this study, more high-quality cross-sectional studies with larger samples are required to demonstrate our findings in the future.

Key words: older adults, functional mobility, executive function

THE RELATIONSHIP OF PHYSICAL ABILITY, MOTIVATION FOR PHYSICAL ACTIVITY AND PSYCHOLOGICAL DISTRESS IN OLDER PEOPLE

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According to Eurostat data in 2019 even 76.4 percent did not devote time to physical activity of the Lithuanian population (Eurostat, 2022). Physical capacity suffers due to insufficient physical activity. Physical capacity affects functional ability, which many older people value more than life itself, as a basis for independent living. How physical capacity, motivation for physical activity, and psychological distress are related to each other in older people has not been widely studied so far. The object of the study is the relationship between physical capacity, motivation for physical activity and psychological distress in older people. The aim of the study is to determine the relationship between physical capacity, motivation for physical activity and psychological distress in older people. The study participants performed tests to determine physical capacity according to the methodology of testing people over the age of 65 (adapted from Jones & Rikli, 2002). An adapted COREOM (Clinical Outcomes for Routine Evaluation – Outcome Measure) questionnaire was used to assess psychological distress. Motivation for physical activity questionnaire: 30 questions, choosing an answer from 1 - completely disagree to 7 - completely agree. The questionnaire assesses five possible domains of motivation for physical activity. Even 100 percent of the subjects showed a better than average score on the "Stop and Go" test (for balance and to identify signs of senile syndrome). The results showed good flexibility of the subjects' lower body, good cardiovascular capacity. We got the worst result when assessing the flexibility of the upper body: 50% of the "Hands behind the back" test. the result of the subjects is worse than the average, 45.7 percent. – average and only 4.3 percent. better than average. After evaluating the obtained results, we can see that the subjects were mostly motivated for physical activity due to well-being and health, the least due to appearance. Subjects experience the least signs of psychological distress when assessing risks to themselves and others, the most when assessing subjective well-being and assessing general functioning, close relationships and social relationships. Older people with average and worse than average physical fitness indicators are more motivated to be physically active. This relationship was established by assessing the strength, endurance and flexibility of the muscles of the upper and lower limbs. Older adults with average to better-than-average handgrip strength and hand muscle endurance experience less distress, and

those with less distress are more motivated to be physically active for wellbeing and health. In the older people group, flexibility and hand grip strength were the worst, while hand muscle strength and endurance, gait speed, and coordination and balance decreased with age. Subjects are most motivated to be physically active for well-being and health, and least motivated to exercise for a better appearance. Subjects experience the least amount of psychological distress when assessing risks to themselves and others, and the most when assessing subjective well-being and general functioning, close relationships and social relationships.

Key words: older adults, psychological distress, motivation for physical activity questionnaire

SITTING CONDITIONS AFFECT ELECTRICAL ACTIVITY OF THE TRUNK MUSCLES AND BRAIN

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A sedentary lifestyle, especially prolonged sitting, is associated with health problems and fatigue of muscles both at work and at home. The onset of fatigue is associated with reduced motor control efficiency, which may contribute to altered trunk muscle activation patterns (Wong et al., 2019; Jia et al., 2018) and changes in postural control (Russo et al., 2018). Variability of the body position, interrupting long periods of sitting, should improve the condition of the skeletal system of sedentary workers. For these reasons, ergonomic measures promoting spinal movements and trunk muscle activation while sitting have become popular, including chairs with different types of sitting surface (Annetts et al., 2012). However, all measures provide only modest dynamic movement, little rest, and little change in muscle activation levels or low back loads (O'Sullivan et al., 2013). The natural ability to maintain an upright body position while sitting on an unstable plane with a hemispheric base may increase pelvic and trunk mobility by activating spine stabilizing muscles (Michnik et al., 2017). Advanced technologies such as fMRI and transcranial magnetic stimulation have enabled studies of brain activity and plasticity, but the electroencephalography method allows studying real-time and spontaneously occurring brain activity with excellent temporal resolution (Assenza et al., 2015). There are studies examining the electrical changes in the brain during standing imbalance (Hülsdünker et al., 2015), but there is not enough research examining the electrical changes in the brain and the effect on postural control during sitting under different conditions. We hypothesize that unstable sitting conditions are associated with higher trunk muscle electrical activity (Michnik et al., 2017) and brain electrical activity (Hülsdünker et al., 2015). The aim of the study was to determine electrical activity of the trunk muscle and activity of the brain under different sitting conditions. Objectives: 1. To compare effect of different sitting conditions on electrical activity of superficial trunk muscles. 2. To compare effect of different sitting conditions on electrical activity of the brain. 3. To establish correlation among different sitting conditions and activity of trunk muscles and brain. The study involved 17 sedentary office workers (10 women, 7 men, age 22-39 y.). Electromyography (EMG; Noraxon U.S.A Inc. CE 0344; CE 0473) was used to assess activity of rectus abdominis, obliquus externus abdominis, erector spinae

muscles. Electroencephalography (EEG; Nautilus Research cap Tec medical engineering GmbH, Austria, 32 electrodes) was used to record cortical activity in frontal, frontocentral and centro-parietal lobe. EMG and EEG was recorded 3 times for 30 sec. while subject was sitting on surfaces with different stability. A regular chair (RCH), an unstable platform (UP) and an unstable platform placed on bearing surface (UPB) was used to create stable, unstable in two directions and unstable in multiple directions seating conditions. One additional training trial was executed prior to registration of EMG and EEG on different conditions. In multidirectional unstable sitting, the activity of trunk muscles increased the most ($p < 0.05$). Electrical activity of m. rectus abdominis did not change when subjects were sitting on UP or UPB compared to RCH ($Z = -1,448$; $p = 0,148$; $Z = -1,086$; $p = 0,278$ respectively). Electrical activity of m. obliquus externus abdominis significantly increased compare sitting on RCH to UP 13,63% ($Z = -3,516$; $p = 0,000438$) and UPB 14,38% ($Z = -3,361$; $p = 0,001$). Electrical activity of m. erector spinae increased 10,52% while sitting on UPB compared to RCH ($Z = -2,999$; $p = 0,003$) and while sitting on UP compared to UPB ($Z = -3,154$; $p = 0,002$). Two directional unstable platform did not evoke significant changes in muscle activity ($p = 0,379$). Electrical activity of the brain while sitting on RCH is equated to 100 percent. The electrical activity of brain theta and alpha waves increased ($p < 0.05$) under more complex sitting conditions. The electrical activity of theta waves increased in frontal lobe 474,88% when sitting on the UPB compared to RCH ($Z = -2,701$; $p = 0,007$) and UP compared to UPB ($Z = -2,803$; $p = 0,005$). Analogous increase of theta waves was detected in fronto central lobe UPB compared to RCH 248,20% ($Z = -2,134$; $p = 0,033$) and centro-parietal lobe 234,8% ($Z = -2,045$; $p = 0,041$) respectively. The electrical activity of alpha waves increased in frontal lobe when sitting on the UPB compared to RCH 257,97% ($Z = -2,293$; $p = 0,022$). Changes in electrical activity of alpha waves in fronto central lobe were not detected as well as differences between the activity comparing UP and UPB sitting conditions. Analogous increase of alpha waves was detected in centro-parietal lobe UPB compared to RCH 242,33% ($Z = -2,134$; $p = 0,033$) respectively. The only correlation established between electrical activity of m. Erector spinae and theta waves in fronto central lobe while sitting on multidirectional unstable surface is moderate ($r = 0,571$; $p = 0,021$). Electrical activity of superficial trunk muscles and electrical activity of the brain increases under more unstable sitting conditions.

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Key words: stiffness, rate of torque development, jump height

PHYSICAL ACTIVITY AMONG SCHOOL-AGED CHILDREN'S DURING THE COVID-19 PANDEMIC: HOW IT RELATES TO SCHOOL ENGAGEMENT AND LEARNING ACHIEVEMENT

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Evidence suggests that there is an association between being physically active and school engagement (Owen et al., 2016), and academic achievement (Sneck et al., 2019; Solberg et al., 2021). Therefore, this study aimed to examine how physical activity of school-aged children during the COVID-19 pandemic is associated with school engagement and learning achievement in the low-SES school context? The research sample was composed of 7th–10th grade students (112 girls and 90 boys). The research participants completed the anonymous questionnaire. Part I of the questionnaire provided basic information on schoolchildren (gender, grade, SES, annual grades for the subjects). Part II contained the Physical Activity Questionnaire for Adolescents (Kowalski, Crocker, & Donen, 2004). Part III contained two subscales of the Student Engagement Scale (Lam et al., 2014), namely Affective Engagement and Behavioural Engagement. Independent samples t-test and Pearson correlation analysis were performed. The research findings showed that the total scores for physical activity of girls and boys were 2.40 (SD = 0.62) and 2.54 (SD = 0.69), respectively. The independent samples t-test ($t = -2.447$, $p = 0.015$) reported a significant difference between the mean of higher affective engagement for girls ($M = 3.41$, $SD = 0.73$) compared to boys ($M = 3.15$, $SD = 0.78$). Furthermore, a statistically significant difference was determined in the behavioural engagement of girls and boys ($t = -4.187$, $p = 0.0001$). The results showed that physical activity of school-aged children is associated with affective ($r = 0.150$, $p = 0.043$) and behavioural ($r = 0.287$, $p = 0.0001$) engagement, however, does not have a significant relationship with academic achievement. The findings of our study demonstrated that school-aged children's physical activity was low. However, it is noteworthy that physical activity correlated positively and significantly to the affective and behavioural engagement.

Key words: physical activity, schoolchildren, affective, behavioural engagement

SHORT-TERM APPLICATION OF KINESIOLOGY TAPE DECREASES KNEE PAIN AND IMPROVES MUSCLE STRENGTH IN INDIVIDUALS WITH COMPLETE ANTERIOR CRUCIATE LIGAMENT RUPTURE

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It is calculated between 30 and to 78 per 100,000 people anterior cruciate ligament (ACL) ruptures every year. One of the strategy to improve functional state after ACL rupture is kinesiotape (KT). But it is still unknown how short-term KT affect muscle strength and pain. 25 subjects were included in the study. They were divided in 2 groups: 1) control group subjects (n = 11; mean age 25.1 ± 3.4 years; mean body mass 80.6 ± 9.6 kg; mean height 180.7 ± 1.8 cm) were healthy (without ACL rupture), 2) experimental group subjects (mean age 24.8 ± 3.5 years; mean body mass 83.1 ± 14.4 kg; mean height 179.9 ± 3.5 cm; mean time after injury 7.9 ± 2.7 weeks) were with complete ACL rupture. Subjects in the control group were tested without KT. Subjects in the experimental group were tested with and without KT. Subjects in the experimental group received KT on quadriceps femoris and biceps femoris muscles for a one-hour interval. Pain, isometric (at 40° and 80° angle) and concentric maximal voluntary contractions (MVCs) at angular velocities of 60°/s and 180°/s were assessed before and one-hour after KT application using the visual analogue scale (VAS) and dynamometry (Biodex Medical Systems, Shirley, New York, USA). Application of KT significantly ($p < 0.05$) reduces pain, increases hamstrings and quadriceps isometric MVC and quadriceps concentric MVC at 60°/s angular velocity ($p < 0.05$). But still significant deficit of MVC ($p < 0.05$) as compared to healthy controls could be seen. Short-term KT could be used to increase muscle strength and decrease pain in subjects with ACL rupture.

Key words: ACL, kinesiotaping, pain, MVC

GENDER DIFFERENCES OF CHANGING TEACHING METHODS UNDER THE COVID-19 PANDEMIC FOR GENERATION "Z" PHYSICAL ACTIVITIES

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Over a year has passed since the beginning of Covid-19 pandemic and the introduction of measures to limit the spread of the pandemic in Latvia. These have resulted in changes in all spheres of young people's lives, including the way they study and exercise. This study examines the role of Generation Z physical activity as a means of maintaining the well-being of the emerging workforce and the choice of teaching methods by different age groups and genders as well as the finances spent on it. The research methods include critical content analysis of scientific literature on Generation Z, modern teaching methods and the role of physical activity in young people's lives as well as descriptive statistical data analysis of primary data obtained from a questionnaire. The generation currently studying in secondary and higher schools is commonly termed Generation Z and also described as the "digital natives" or the "net" generation. An important event informing the development of Generation Z is the emergence and spread of digital technologies, often regarded as the main feature of Generation Z. Generaton-Z are characterized by their interest in a healthy lifestyle and a sustainable well-being. The aim of this study is to investigate the role of physical activities and the choice of platforms and genders by genders within Generation Z and the relation between the amount of sport activity and reported well-being. In the current research, a questionnaire was distributed among Generation Z representatives of both genders to determine answers to the study inquiries concerning gender differences in the attitude of the Generation Z females and males towards mental health, sport activities, the expenditure of finances for improving health and preventing disease and the changes that took place during the pandemic, and also the use of digital tools and applications in combination with modern teaching methods for the instruction in sports and exercise. The survey took place from the beginning of March 2021 until the end of May 2021. In all, 441 respondents living in Latvia gave their anonymous answers, most of them students studying social and exact sciences: most respondents were BA and MA students from the different universities. The respondents were divided into the following age gender groups: from 20 to 23 (70,7 % of the participants) and from 24 to 26 (29,3 % of the participants). Worldwide studies in general and research conducted in European countries particularly foreground the

problem of internal cohesion within Generation Z from the angle of gender. Studies suggest that there are notable divergences in the two Generation Z genders' attitude across world, in various parts of Europe and even in Latvia. Overall, this study confirms that the pandemic left a profound adverse effect on the active lifestyle, health and sporting practice among both females and males of Generation Z in Latvia, with some pronounced gender difference observable. Thus, our survey results show there are substantial differences between the two genders in their physical activity, drinking and smoking habits, and the presence of depressive mood. In determining the most popular applications and platforms for learning sports and practicing physical activities, the following applications were the top choice among the Latvian Generation Z representatives of both genders: Nike Training Club ($p = 0{,}323$), Facebook (app) ($p = 0{,}408$). However, the most popular platform was YouTube, which was somewhat more favored by female, as observed through the comparison of mathematic results, though the statistical difference was insignificant.

Key words: teaching methods, Covid-19 pandemic, Generation Z

SCHOOLYARD DESIGN AND PHYSICAL ACTIVITY LEVELS OF STUDENTS DURING C IN ESTONIA

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Studies about recess have found that children have higher physical activity (PA) during outdoor recess compared to indoor recess, and well-constructed schoolyards play an important role in stimulating PA in children. This study aimed at investigating the affordances of schoolyards and students' PA levels during outdoor recess in two urban and two rural primary schools in Estonia. Schoolyards were described with the geographical mapping method and PA levels were measured with accelerometers. Students from grades two to six (8–13-year-olds) were included in the study. All observed schoolyards had different spaces including various ball game areas, climbing facilities, and slacklines. Rural schoolyards had more natural environment, whereas artificial surfaces dominated in urban schoolyards. Students participating in outdoor recess spent about twice as much time (20.4%) on moderate-to-vigorous PA (MVPA) compared to indoor recess (9.5%), although boys were more active than girls (22.9% vs. 17.3%). Furthermore, students at school level II (grades 4-6) spent more time in MVPA compared to students at school level I (grades 2-3) (22.2% vs 17.4%). All schoolyards afforded more MVPA during outdoor recess compared to indoor recess, whereas schoolyards with more space per child and more natural environment generated higher MVPA. These findings confirm the importance of schoolyard design and quality for the variety and intensity of students' PA during outdoor recess.

Key words: outdoor recess, schoolyards, physical activity

BIBLIOMETRIC AND VISUALIZED ANALYSIS OF EXERCISE AND OBESITY

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Obesity is a complex, multifactorial disorder of the energy homeostasis system. The relationship between physical activity and obesity has attracted an increasing number of researchers in recent years. However, the relationship between physical exercise (such as duration and intensity) and obesity were still not fully understood. In this study the bibliometric analysis was designed to investigate a systematic understanding of developments in exercise and obesity research over the past 20 years. Relevant publications from the Web of Science Core Collection were downloaded on Marth, 2023. VOSviewer (version 1.6.19), and the online bibliometric analysis platform were used to conduct this scientometric study. In total 442,108 scientific articles on the topic of obesity were published between 2010 and 2023 (including descriptive studies, clinical trials and reviews). The 'obesity' with a total link strength (TLS) of 3,370 appeared as the most frequent keyword which had a strong link to 'adipose tissue' (TLS = 904) and associated with 'adipogenesis', 'diabetes' and 'inflammation'. In total 325,649 publications on 'exercise and obesity' during the same period were identified. The number of publications continues to increase gradually every year. The keyword 'exercise' had a strong link to 'obesity', 'physical performance', 'skeletal muscle', 'adipogenesis', 'myokines'. Keyword 'obesity' had 68 occurrences (TLS 361) and 'myokine' - 206 occurrences (TLS 974). The relationship between exercise and obesity was well-discussed topic in recent years and number of publications grows exponentially. Our study showed that the study in this field of obesity mainly focused on physical exercise, role of skeletal muscle and myokines.

Key words: scientometric study, physical exercise, obesity

THE COACH-ATHLETE-PARENT (C-A-P) RELATIONSHIP IN SPORTS: THE IMPORTANCE OF THE SEX, SPORT TYPE, AND FAMILY COMPOSITION

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Interpersonal relationships exist in many forms within the sport environment. Athlete performance and career direction, at times, depend on their formed sport relationships. Positive and negative interpersonal relationships among the coach, the athlete, and the parent affects many athletes' behavioral outcomes, such as continued participation. Our research aimed to understand whether the positive and negative processes in the coach, athlete, and parent interpersonal relationships depend on athletes' sex, age, family composition, sport experience, and the type of sport. To achieve our research purpose, 632 volunteer student-athletes (aged 11–19) completed our survey. Our survey included the Positive and Negative Processes in the Coach–Athlete–Parent (PNPCAP) relationship scale and demographics (i.e., sex, age, family composition, years in competitive sport, and sport type). The study results revealed that positive processes, as measured by the positive PNPCAP subscale, were invariant to our categorical variables. However, participants' self-ratings of negative PNPCAP-measured processes depended upon sex, sport type, and family makeup. Significant ($p < 0.05$) two-way interactions revealed boys involved in individual sports and residing without their parents or with one self-reported a higher level of the negative processes. The calculated effect size values with the other groupings were mostly medium in magnitude. The third significant two-way interaction resulted for sport type by family makeup. This two-way interaction revealed individual sport participants without or residing with one parent reported higher levels of negative processes. The effect size values were a mix of small and medium in meaningfulness. While positive Coach–Athlete–Parent processes appear invariant to our measured categorical variables, sex, sport type, and family makeup moderated the negative processes. Further research, such as mixed methods, is required to best understand and provide direction for intervention research to reduce negative processes in youth sport.

Key words: coach, athlete, parent, interpersonal relationship

STUDY OF SHORT– TERM AND LONG– TERM EFFECTS OF DIFFERENT MUSCLE RELAXATION TECHNIQUES ON MASTICATORY SYSTEM MUSCLE TONE, FUNCTION AND PAIN

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Research problem: The effectiveness of manual therapy and orthodontic apparatus in the treatment of temporomandibular joint pain has already been proven, it is additionally important to find out whether the applied methods have a lasting effect, and whether their combined short– term and long– term effects on the masticatory system are significant. Research aim: To determine the short– term and long– term effects of different muscle relaxation techniques on masticatory system muscle tone, function and pain. Hypothesis: In this study, it is believed that the combined muscle relaxation technique will have a better lasting effect on the muscle indicators of the masticatory system. Methods: Subjective and objective assessment of pain intensity; assessment of head position, neck and lower jaw range of motion measurement; measurement of maximal opening, muscle tone and strength; objective temporomandibular joint disorders questionnaire; occlusal splint therapy; trigger point release therapy. Results: After an 8-week study, in the TT group, the tone of the masticatory, temporal and sternocleidomastoid muscles significantly decreased ($p < 0,05$), the left deviation of the mandible significantly increased ($p < 0,05$), the right temporal and both sides of the sternocleidomastoid muscles pain significantly decreased ($p < 0,05$). In the MK group, the pain of the right temporal and both sides of the sternocleidomastoid muscles decreased significantly ($p < 0,05$), the tone of the masticatory, temporal and sternocleidomastoid muscles decreased significantly ($p < 0,05$), the mandible protrusion significantly increased ($p < 0,05$). In the TTMK group, the pain and tone of masticatory, temporal and sternocleidomastoid muscles significantly decreased ($p < 0,05$), the strength of masticatory muscles, mandible protrusion and deviation significantly increased ($p < 0,05$). Conclusions: Subjects who received a complex of trigger point release in combination with occlusal splint therapy showed significant short– term and long– term changes in the assessment of pain and tone of the masticatory, temporal and sternocleidomastoid muscles, masticatory muscle strength, mandible protrusion and deviation, more than when compared to the methods used alone.

Key words: temporomandibular joint, pain, bruxism, occlusal splint

INTERNAL LOAD AS MARKER FOR TRAINING MONITORING IN ENDURANCE SPORTS

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Athletes frequently use manipulations with training intensity, duration, and frequency, to stimulate adaptation for perforamance improvement. External training load is the result of these components as the form of training prescription, while internal load can be characterised as the physiological stress in the body, caused by external traininig load. For continuous adaptation, training load should be increased step-by step, while too high increases in training load might lead to overtraining. Therefore, understanding, measuring and monitoring of the training load should be highly focused in the training process. Training intensity has been considered as most studied factor that triggers adaptation. Accordingly, in endurance sports 80:20 intensity distribution (low vs high intensity) has been suggested for optimal balancing between stress and recovery. However, recent research has also focused training duration, as an under-investigated component of training load, especially in endurance sports. Indeed, low intensity training around aerobic threshold intensity might be an easy training if the duration is short, but if increasing the duration, the same intentsity level might turn to very hard training. The increase of the "cost of training" might be also as the result of other counfounding factors, temperature, glycogen stores, excessive fatigue, etc. One practical method is to measure an individual's subjective response to training load. "How hard was your workout?" has been shown to be a valid tool as a session rating. This keynote aims to characterise different quantification methods of session rating based internal training load in the training monitoring process ,and their relationships between performance and fatigue.

Key words: training load, endurance sports

RELATIONSHIPS BETWEEN SCHOOL PERSONNEL'S PHYSICAL ACTIVITY AND CHILDREN'S PHYSICAL ACTIVITY ATTITUDES

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School personnel spend most of their day in the school environment and can struggle with meeting the recommended PA levels due to the nature of their occupation. However, they are role models for students, and their attitudes towards physical activity can impact students' physical activity habits. The aim was to assess school personnel's (teachers, administration, support staff and office staff) physical activity and their attitudes regarding the importance of physical activity among students. The physical activity levels of 1030 school employees in Estonia were assessed using an accelerometer. Participants also responded to a questionnaire about physical activity habits, overall health, and attitudes about the importance of physical activity among students. About 92.6% of the participants met the World Health Organisation's weekly physical activity recommendation. However, 69.1% of the accelerometer wearing time was spent being sedentary. Only 5.8% of the wearing time was spent in moderate to vigorous physical activity. More active school personnel believed their lead affects students' attitudes towards physical activity ($r = 0.072–0.156$, $p < 0.05$) and being active at recess facilitates a peaceful learning environment in the classroom ($r = 0.064–0.072$, $p < 0.05$). Whereas more sedentary school personnel did not encourage students to be active at recess ($r = -0.073$, $p < 0.05$). More active school personnel had more positive attitudes towards physical activity, which demonstrates the importance of focusing on encouraging physical activity among school personnel as they can affect the behaviour of students.

Key words: physical activity, teachers, school personnel, accelerometers, attitude

'CONSCIOUS 9 MONTHS'. GESTATIONAL DIABETES MELLITUS LIFESTYLE PROGRAMME COMBINING REGULAR EXERCISE AND NUTRITIONAL INTERVENTION: A MIXED-METHOD CASE REPORT

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Gestational diabetes mellitus is a glucose tolerance disorder endangering maternal and foetal health. Lifestyle modifications for the mother are recommended to control the glucose levels before the use of pharmacotherapy. However, the successful implementation remains challenging for women, is still underrepresented in the literature, and is not part of current practice. In this mixed-method, instrumental case report, quantitative and qualitative methods were used to explore the complex lifestyle intervention designed specifically for pregnant women with gestational diabetes, combining the exercise and dietary interventions with ongoing maternal education and support, using the example of one woman. The intervention started in week 24 of gestation. Nutritional recommendations of low glycaemic index (<55%) and glycaemic load meals were made. Physical activity intervention included regular and supervised exercise programme three times a week until delivery (48 sessions in total). The meaningful practitionerparticipant relationship was maintained. The participant was also under the standard care of a gynaecologist and a diabetologist. The participant's glucose levels remained within norms throughout her pregnancy, without the need for pharmacological intervention. The outcomes of the pregnancy included a non-Caesarean delivery and a normal size healthy newborn. In this case, the participant successfully completed the intervention, implementing the recommended lifestyle changes and avoiding complications associated with this health condition.

Key words: pregnancy, gestational diabetes mellitus, exercise and dietary

BASKETBALL FREE THROW BIOMECHANICS: MOVEMENT VARIABILITY'S IMPACT ON THROWING ACCURACY AND DYNAMIC STABILITY OF THE UPPER LIMB

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The accuracy and ability to shoot an effective free throw in basketball is critical part to any player's success and thus there are many factors that need to be considered. Skilled players are typically considered to exhibit less outcome variability and it has been interpreted as a factor that needs to be minimized for optimal performance. 11 professional basketball players were asked to perform 20 free throws in a row. Each free-throw was filmed using two cameras, in the frontal and the sagittal planes. Special markers were placed on anatomic landmarks. Angles and positions of the upper limb were measured using motion analysis program. To measure variability of every set of upper limb position parameters, coefficient of variation was calculated as the ratio of the standard deviation to the mean. The mean accuracy of the players was 86,36 ± 7,78 %. The average value of dynamic stability of the team was 94,14 ± 3,19. There was significant strong negative correlation between angle of the humerus to vertical axis in release phase and the accuracy ($p = 0,004$, $r = -0.791$). It was also found that there is a strong positive correlation between accuracy and angle of both wrist extension and flexion in release phase ($p = 0,048$, $r = 0,523$). Strong negative correlation between variability of angle of the humerus to vertical axis in release phase and dynamic stability was found ($p = 0,046$, $r = -0,536$). Relation between dynamic stability and accuracy was significant ($p = 0,04$, $r = 0.623$), which indicates strong positive correlation between the variables. Conclusions: 1. Lower movement variability of the shoulder in the frontal plane and higher movement variability of the wrist in the sagittal plane, during release phase, result in greater throwing accuracy. 2. Lower variability of the shoulder results in better dynamic stability. 3. Dynamic stability is necessary for accuracy.

Key words: accuracy, movement variability, dynamic stability

INVESTIGATING WARM-UP STRATEGIES IN BASKETBALL

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Warming-up prior to exercise is essential for subsequent optimal performance. In basketball, traditional warm-up strategies including typical basketball skills (dribbling, shooting etc.) and small-sided games (SSGs) are implemented before training sessions or official matches. However, no previous investigation assessed and compared their effectiveness. Therefore, the aim of the current study was to investigate the effects of basketball pre-game traditional warm-up (TWU) protocol over the SSGs warm-up protocol on jump, sprint, and agility performances. Using a randomized cross-over study design a sample 9 University Basketball players completed 8-minutes general warm-up, followed by 12 minutes of either traditional warm-up which included lay-ups and technical movements or small-sided games of 1on1, 2on2, and 3on3. Countermovement jumps (CMJs), 10m, 20m sprint and 5O5 agility tests were assessed before and after the warm-up protocols using OptoJump and Witty MicroGates. Total quality recovery scale (TQR) before and rating of perceived exertion (RPE) after the sessions were also assessed. Statistical analysis was performed via two-way (pre-post protocol and TWU-SSGs) repeated- measures ANOVA after normality assessed using Shapiro-Wilk test. Non- parametric analyses were also performed on RPE and TQR. The results indicated no significant ($p>0.05$) difference in any performance for both the independent variables (time and warm-up typology). Moreover, there was a significant interaction between time and condition in 10m sprint ($p < 0.05$), although post-hoc analysis calculated with Bonferroni correction showed that there is no significant difference ($p > 0.05$). Additionally, no differences ($p > 0.05$) in pre-session TQR and post-session RPE were shown. This study revealed that both traditional and SSGs warm-up protocols have similar results on the jump, sprint and agility performance and can be used interchangeably. More research is needed to understand the effect of SSGs warm-up on other parameters such as the reactive and cognitive stimuli.

Key words: warm-up, small-sided games, sprint, agility

HOW COVID-19 PANDEMIC CHANGED EUROLEAGUE BASKETBALL COMPETITION

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The aim of this study was to understand how training and playing conditions during the COVID-19 pandemic affected the performance of Euroleague Basketball players. Using a non-participant observation analysis, the study compared the seasons before the lockdown (2018–2019 and 2019–2020; pre-pandemic) with the season after restart (2020–2021; pandemic). Paired t-tests and Wilcoxon tests were applied for variables with normal and non- normal distributions, respectively. The results revealed significant changes ($p < 0.05$) in several offensive and defensive performance-related variables during pandemic times (without attendance): free throw attempts, free throw percentage, turnovers, three-point attempt rate, fouls (small effect sizes, ESs), points, and possessions (trivial ES). The pre-pandemic HA (70%) significantly decreased after the lockdown, with games played with no crowd (~51%; $p = 0.018$, large ES). The one-sample t-test showed that the HA after the COVID-19 interruption was not significantly greater than 50%, indicating that the HA did not endure during the pandemic condition. Although significant differences between home and away teams were found for most performance-related variables (excepting turnovers) in both pre-pandemic and pandemic conditions, variations of the relative HA were only significant for free throw attempts (large ES), points (medium ES), and turnovers (medium ES). The results of this study showed that performance variables were affected by the COVID-19 lockdown. Thus, these findings may help coaches, players, and referees to counteract unwanted competitive events and improve their overall performance, regardless of the contextual/situational circumstances encountered.

Key words: COVID-19 pandemic, performance of Euroleague Basketball players

THE EFFECT OF AN ACTIVE BREAK INTERVENTION ON NONSPECIFIC LOW BACK PAIN AND MUSCULOSKELETAL DISCOMFORT DURING PROLONGED SITTING AMONG YOUNG PEOPLE - PROTOCOL FOR A RANDOMIZED CONTROLLED TRIAL

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The COVID-19 pandemic caused an increase prevalence and intensity of low back pain (LBP) among young people. Young people spend most of their time in a sitting position while studying and using electronic devices. Even though the sitting posture will be followed by proper ergonomic principles, every position maintained for a prolonged time leads to discomfort and soft tissue symptoms. Objective: The aim of the study is to evaluate the effectiveness of the active break program on reducing LBP and perceived musculoskeletal discomfort during prolonged sitting in young people with LBP. This will be a randomized controlled study. The participants will be recruited from students of a Bachelor course in Physical Education. The participants will be assigned to experimental group and a control group. The experimental group will be recommended to take an active break for every 30 minutes of sitting or whenever musculoskeletal discomfort occurs. The control group will receive self-care recommendations. The outcomes will be frequency of LBP (questionnaire), average pain intensity (Visual Analogue Scale), functional disability measured using the Oswestry Disability Index and perceived musculoskeletal discomfort during prolonged sitting (Borg scale), assessed at baseline and after the 12-week intervention, and participants' Global Perceived Effect of change (7-point Likert scale), Adherence to Active Break Program at Completion of Initial 12 Week Intervention (questionnaire) and Satisfaction after the intervention (5-item self-completed questionnaire), assessed only after the 12-week intervention. Assessor and participants will be blinded. Our main research outcome – exercise protocols and interventions – will help to develop ergonomic recommendations for young people with LBP.

Exercises and recommendations will be the basis for developing a proprietary preventive and therapeutic program, which will be implemented in educational institutions.

Trial Registration: ClinicalTrials.gov NCT05810519

Key words: exercise, treatment, spine, posture, students, pain

This work was supported by the Ministry of Education and Science in the years 2023-2024 under the University Research Project at Józef Pilsudski University of Physical Education in Warsaw „Development of an effective intervention to reduce low back pain and musculoskeletal discomfort caused by prolonged sitting in young people" [3/BN/UPB/2023].

SHOULDER JOINT ADAPTATION TO TRAINING IN VOLLEYBALL IN YOUNG FEMALE PLAYERS

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The volleyball player's shoulder adapts to perform regular spikes which results in the range of movement (ROM) changes, arms' muscle strength, and force differentiation side-asymmetry. Too large training volumes could lead to pathological changes in the shoulder girdle. The aim was to evaluate shoulder joints' ROM, peak isometric strength of arms muscles, submaximal force repetition error, and upper body dynamic stability in well-trained female volleyball players. 15 young well-trained female volleyball players participated. The shoulder active ROM in internal rotation (IR), external rotation (ER), flexion, extension, abduction, adduction, horizontal abduction (HABD), and adduction (HADD) were measured using a goniometer. The peak force and the ability to repeat the submaximal force of IR, ER, and extension muscles were determined in isometric contractions using a handheld dynamometer. Dynamic stability was determined by the Y–upper-body dynamic balance test (YUBDST). The ER ROM (97° ± 12° in the dominant D, 95°±10° in the non-dominant N shoulder) was increased. The IR (54° ± 12°D and 62° ± 8°N) and HADD (34° ± 8°D and 35° ± 10° N) ROMs were decreased. The extension and adduction ROMs were smaller in the D shoulder ($p < 0.05$). The D arm's IR, ER, and extension muscles developed greater peak forces ($p < 0.05$). ER/IR muscles' peak forces ratio was 0.93 on both shoulders. The D arm's extensor and ER muscles' submaximal force repetition error was smaller ($p < 0.05$). YUBDST normalized reaching distances sum was 95 ± 6% in the D and 94 ± 7% in the N arm, symmetrical on both sides. Regular repetition of volleyball spikes led to an increase in ER, a decrease in IR and HADD ROMs, and muscle strength and its differentiation ability growth, especially in the D arm. The action of shoulder ER and IR muscles was balanced. The upper body dynamic stability was the norm and did not depend on the rotator muscles' strength.

Key words: shoulder, flexibility, muscles strength, proprioception, dynamic balance

ANALYSIS OF EXERCISE HABITS AND PHYSICAL ABILITIES OF UPPER SECONDARY SCHOOL STUDENTS

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Several studies have been carried out in Estonia that look at the physical activity and exercise habits of children aged 7-15 both at school and in their free time. The health behavior of high school students has been little studied, and no separate attention has been paid to this age group in existing studies. However, it is especially important to pay attention to the health behavior of young people at this age, as the Defence Forces are largely directly from upper secondary schools. During the project, aspects related to training, exercise and health of young people, factors affecting them and qualities necessary for conscripts that are important from the point of view of the Defence Forces were mapped. The data from the Sports Register provided an overview of how many young people participate in sports training and at what age The second phase of the project involved 12 individual interviews with young people aged 15-22, and 2 focus group interviews with representatives of municipalities and sports managers and coaches. The study found that several measures would help to deal with training, according to both young people and other parties – however, the measure depends a lot on the young person and his needs and desires. It was stressed that workouts could be less focused on continuing in competitive sports – several young people mentioned that they would like to exercise only to maintain physical activity, not to achieve peak results. In addition, young people pointed out that it was important that training sessions could be flexible and responsive to the needs of young people, more accessible, and training conditions should be suitable for young people. Physical activity, good nutrition and weight management are important qualities to maintain health and performance, then the reasons and motivators mentioned are important to remember in order to deal with the topic of exercise habits in young people. When it comes to improving physical fitness, participation in training is very important.

Key words: exercise habits, young people, Sports Register, Defence Forces

CONSTRUCTIVISM IN SCHOOL EDUCATION: A QUALITATIVE SYSTEMATIC REVIEW

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The entry of new concepts, approaches and technologies in all areas of life and also in education is a global process. The addressee of today's school education process is both the student and the future society. However, even in the same context (school education), authors often interpret the constructivist approach differently, and the understanding of the practical application of this theory is also wide. This ambiguous understanding affects both the learning process and the assessment of learning achievements, as well as the development of learning materials. The purpose of this study: 1) to find out the ways how the constructivist approach is understood and implemented in school education, 2) to find possible reasons why different understandings of the constructivist approach in school education have been formed. Qualitative systematic literature review method with conceptualization, context: school education, education stage ISCED 2/ ISCED 3 (age of students 10-16 years). 46 research publications from Academic Search Premier, Web Of Science, Scopus and Google Scholar have been analyzed. Such an overview is interpretive, explanatory, the purpose of such an approach is the preparation of a comprehensive presentation, explanation. Three main categories of understanding of the definition of the constructivist approach in school education have been established, and two explanations for this different understanding have been proposed. This study identifies different understandings and uses of the term in three general categories. Two important reasons for this variety of uses and understandings have been identified: 1)the authors do not mention or justify the aspects of the approach that are being worked on, 2) the approach is studied or used in different perspectives.

Key words: constructivism, pedagogy at school

LONGITUDINAL PHYSICAL ACTIVITY, PHYSICAL FITNESS, BODY COMPOSITION AND COGNITIVE SKILLS IN PRESCHOOLERS

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The wide range of physical and mental health benefits related to engagement in physical activity (PA), good physical fitness (PF) and having optimal body composition in childhood are well known, and early years are regarded as the most formative period of cognitive development. Yet, little is known about the longitudinal associations regarding PA, PF, body composition and cognitive skills in preschoolers. Participants were Estonian children (n=147) in final year of kindergarten and in first grade. Body composition was assessed by skinfold thicknesses, PA by accelerometry, PF by using standardized fitness tests and cognitive performance with modified Boehm-3 test. Higher cardiorespiratory fitness, relative lower-limbs strength, speed-agility fitness and static balance in kindergarten were related to lower body fat mass values at school. Higher PA and reducing sedentary time in kindergarten were related to higher fat-free mass at school. Higher PA, especially VPA, and reducing sedentary time in kindergarten were related to higher cardiorespiratory fitness, upper- and lower-limbs strength and speed-agility fitness at school. Reallocating only 5 min/day of sedentary time with VPA at kindergarten was related to higher fat-free mass and lower fat%, as well with better PF at school. Higher PA and lower sedentary time in kindergarten were related to superior conceptual skills at school. Higher PF in kindergarten was associated with superior perceptual skills at school. Better PF status and higher PA at preschool is associated with healthier body composition in first grade at school. Higher PA, and especially VPA, at preschool age is associated with higher PF status in first grade at school. Higher PA and better PF status at preschool age is associated with superior cognitive development in first grade at school

Key words: children, body composition, physical activity, physical fitness, cognitive skills

LONGITUDINAL DEVELOPMENT OF CARDIORESPIRATORY FITNESS IN CHILDREN IN TRANSITION FROM KINDERGARTEN TO BASIC SCHOOL ACCORDING TO PARTICIPATION IN ORGANIZED SPORTS

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The purpose of this study was to assess the longitudinal development of cardiorespiratory fitness in children in the transition from kindergarten to basic school according to participation in organized sports. The secondary aim of the study was to estimate the associations of body composition indices and cardiorespiratory fitness during the transition from childhood to preadolescence. The children from Tartu participated in three-staged longitudinal study (212; 6.6 years, 136; 7.6 years and 142; 11.5 years participants) for 5 years. Children were categorized into three groups according to participation in organized sports in study period (whole period, episodically, never). Cardiorespiratory fitness was assessed using 20 m shuttle run test. Body composition was measured by skinfold thicknesses. Physical activity was registered with accelerometer. International gender- and agespecific fitness reference normatives were used. Children who participated consistently in organized sports had significantly higher cardiorespiratory fitness level and lower body fat percentage (31.34 ± 13.5 laps in 20 m shuttle run; 21.08 ± 6.25%) in 11.5 years as compared to children who had never participated in sports clubs (20.68 ± 12 laps; 26.09%). Body composition and cardiorespiratory fitness did not associate in consistently trained children. The proportion of 5th Grade children demonstrating age appropriate healthy CRF was almost threefold higher in group of consistent sports trainings among both in boys and girls than among non-members of sports clubs. Consistent attendance in organized sports in childhood and early preadolescence ensures higher CRF and more healthier body composition as compared to children who had no experience of organized sports.

Key words: cardiorespiratory fitness, children, body composition

OPTIMISING PERFORMANCE: WHAT PROMOTES ATHLETES GOOD PERFORMANCE IN THE EQUESTRIAN COMPETITION?

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The identification and prioritization of performance factors significantly affects not only the effectiveness of the competition, but also the course of the training process, characterizing the entire process as a whole. In practice, the distribution of factors of the adult age group differs from the distribution of factors influencing the performance of junior and young riders, but the review of the literature shows a generalization of factors that does not reflect and does not show the influence of these factors in the specific age group. The aim of the research is to find out consensus of the opinion of Latvian equestrian sport experts about the promoting factors of good performance in equestrian competitions in the adult athletes' age group from 22 and more years. Scientific literature review and analysis, Delphi method (expert consensus method), Qualitative and quantitative data analysis using MAXQDA – Version 22.2.1 programme and IBM SPSS Statistics – Version: 29.0.0.0 (241) programme. Participants: 12 Latvian equestrian sport experts. Preliminary results show that the rider's experience, psychological skills as well as warm-up before the competition are the main factors ensuring success in this age group and according to the groups of factors presented, a more detailed breakdown of the factors in the context of the study follows The answers given in the survey of Latvian experts largely coincide with the factors mentioned in the literature, which directly or indirectly influence and promote the performance and efficiency of the rider and the horse in competitions. Therefore, the given answers can be considered to be taken into account and based on them future studies.

Key words: equestrian competition, riders' performance, Delphi method

SUPPORTING UKRAINE'S OLYMPIC SPORTS IN HOSTILE CONDITIONS

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After February 24, 2022, Russian troops destroyed a lot of sports infrastructure in Ukraine, many athletes stood up to defend their Motherland, part of them have no opportunity to continue the training process, and thus many sports talents are lost. All civilized countries condemned the Russian Federation's invasion of Ukraine and severe tough sanctions against the aggressor country. The world sports community also condemned this illegal military aggression. The athletes responded with incredible speed and determination. An unprecedented ban by the IOC and IPC on Russian and Belarusian athletes and officials from participating in the Winter Paralympic Games in Beijing following Russia's attack on Ukraine. To support Ukrainian athletes, the authors initiated a study aimed at identifying the most important needs of Ukrainian Olympic sports in hostile conditions. (6-10) We tried to determine the priority areas of development of Olympic sports, which will be important to support during the war and after it, in order to protect the career prospects of Ukrainian athletes. The aim: To identify the most important needs of Ukraine Olympic sports in hostile conditions. To develop the priority areas that will be important to support during and after the war period to protect Ukrainian athletes' career prospects and identify targeted and well-informed priorities of developing of Ukraine's Olympic sports that could be promoted and prioritized in the current or future agendas to create the appropriate directions of the international supporting to protect Ukrainian athletes' career prospects. Methods: A three-round Delphi study was conducted with 42 participants who had expertise as a coach, athlete, researcher (PhD, habiliteted doctor) in sport science. Results: There was strong panellist agreement in the needs of Ukraine's Olympic sports in hostile conditions identified. The list of the final top 10 needs included (I) "Develop and maintain the athlete's fitness level". This was followed by (II) "Implementation the better system of athlete recovery " and (III)" To ensure a safety training place for athletes". Conclusions: The needs identified in this study on tremendous value and provide guidance for efforts helping to the Ukraine's sports talents during the wartime and, as a result, will guide the international institutions to direct appropriate aid and international support.

Key words: Olympics sport, support of Ukrainian athletes, sport and war, IOC

THE IMPACT OF THE UPPER BODY POSITION ON THE SIDE KICK WITH LEG IN KICKBOXING

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The position of the upper body position is indicated as the most important factor directly influencing the performance of the kick in kickboxing. There are a lot of information about the external forces involved in the movement that can help the coach or sports scientist quantify the athlete's performance or physical development. The aim of the research: to determine the effect of a change in the position of the upper body of a kickboxer on the time of execution of the side kick with the foot placed in front and the ground reaction force in the place, moving forward and in the counterattack. 14-16 years old 10 kickboxers took part in the research. Side kick with the front foot in the counterattack, it is recommended to keep the upper body in the position 0° to the vertical axis, because in this position the kick leg reaches the highest speed (3.95 ± 0.04 m/s) and kicking execution time in this position is the shortest (0,70 ± 0,01 s) compared to other upper body positions. The shortest execution time of the side kick on the place and moving forward was in the upper body position 0° and 45° to the vertical axis, but the fastest kick was performed in the upper body position 90°. But the side kick with the front leg in a counterattack in the upper body position 90° to the vertical axis has the shortest execution time and the fastest kick. Fastest side kick with the forward foot in the place and moving forward will be in the upper body position 45° to the vertical axis, but performing side kick with the forward foot in counterattack and side kick moving forward from the position of the upper body 90˚ against the vertical axis was partially proved.

Key words: kickboxing, position of the upper body, side kick

TEST-RETEST RELIABILITY OF MOTORIZED ALEX7 DEVICE FOR RESISTED AND ASSISTED SPRINTS IN YOUTH BASKETBALL PLAYERS

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The aim of this study was to establish the test-retest reliability of measures obtained from the Alex7 motorized device in assisted and resisted modes and to compare the differences in speed and kinematic characteristics between resisted and regular sprint in order to establish individual variability within a youth basketball team. Twenty-two male basketball players (age: 15.6 ± 0.5 years, stature: 190 ± 9.3 cm, and body weight 74. ± 10.2 kg) performed 30-m sprints with 20-m split under three different conditions: regular, resisted (with resistance by 10% of body mass), and assisted (with assistance by 6 kg). Sprint times and kinematic parameters were assessed simultaneously by Alex 7 motorized device, OptoJump modular system and Witty Timing Gates. Relative reliability was assessed by calculating two-way mixed intra-class correlation coefficient (ICC). To test for differences between the resisted and regular conditions, paired samples T test was used. The split times showed good to excellent between-session reliability (ICCs = 0.84-0.94). CV varied from 1.0 to 1.4% while SEM varied from 0.01 to 0.06 s, for the various time intervals not depending on running conditions. Applying resisted running conditions resulted in significant changes in kinematic variables, such as stride length, ground contact time, flight time, and running speed ($p < 0.001$), and in running pace ($p < 0.05$) compared to regular sprint. The ALEX7 device is an effective tool for generating resisted and assisted running conditions, which can be essential for modifying running loads during training. With its high reliability, the device provides a precise way to control training stimulus, highlighting its value as an innovative training tool.

Key words: kinematic parameters, resisted run, assisted run, regular run

ASSOCIATION BETWEEN BODY MASS INDEX STRUCTURE AND PHYSICAL ACTIVITY, SLEEP, SEDENTARY BEHAVIOR, MENTAL HEALTH, EMOTIONAL INTELLIGENCE

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Growing evidence-based research indicates that various forms and amounts of physical activity (PA) are effective in combating many chronic diseases, improving well-being and mental health, and reducing all-cause mortality. The effect of PA on various body functions is rather specific; i.e., it depends on the non-linear manner of muscle work intensity, duration, and load "doses" and individual's age, gender, health, and BMI. To determine how the body mass index (BMI) structure (underweight, normal weight, overweight, and obesity grades I and II) is associated with the physical activity (PA) structure (light physical activity (LPA), moderate physical activity (MPA), and vigorous physical activity (VPA), sleep, sedentary behavior (SB), eating habits, stress, depression, health, and emotional intelligence (EI). We surveyed 8,759 people (6,400 women and 2,359 men) aged between 18 and 74 years. We used Danish PA Questionnaire, 10-item perceived stress scale, Schutte self-report emotional intelligence test. EI was higher among overweight and obese men than normal weight and underweight men. LPA in women and men, and especially VPA METs structures, SB, significantly were associated with the BMI structure, whereas sleep METs didn't depend on the BMI structure. As BMI increases, VPA significantly decreases in men and women. We identified a significant direct correlation relationship between VPA and eating breakfast. We determined that health and stress depended on the BMI structure only among women and EI depended on the BMI structure only among men. We found that of all energy expenditure determinants VPA had the best correlation with the BMI structure among both women and men.

Key words: body mass index structure, physical activity, perceived stress, emotion intelligence, healthy eating style

EFFECTS OF DIFFERENT FASTING DURATIONS ON GLUCOSE TOLERANCE IN MEN

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It is well established that fasting impairs glucose tolerance, but the influence of the duration of fasting on glucose intolerance remains unknown. We aimed to explore whether prolonged fasting would increase noradrenaline concentrations to a greater extent than short-term fasting; if so, this should lead to improved glucose tolerance. Young adult men were randomly assigned to undergo a 2-day fast (n = 15), 6-day fast (n = 14), or the regular diet (n = 14). Catecholamine concentrations before and after trials, glucose and insulin areas under the curve (gAUC and iAUC, respectively) derived from the oral glucose tolerance test after all trials were assessed. Adrenaline concentration increased only after the short-term fasting ($p < 0.05$). Fasting increased the gAUC ($p < 0.05$), but the gAUC remained higher than the baseline value after subjects returned to their regular diet in the short-term fasting group ($p < 0.05$). Fasting had no immediate effect on the iAUC, although it increased after return to their regular diet in the prolonged fasting group ($p < 0.05$). To sum up, 2-day fasting had residual impaired glucose tolerance which might be linked to elevated stress after fasting. In contrast, 6-day fast seems to evoke adaptive residual response that is related with increased insulin release and maintained glucose tolerance. This work was supported by the Research Council of Lithuania (grant number S-MIP-23-84).

Key words: glucose tolerance, adrenaline concentrations, prolonged fasting, young adult

STUDENTS PREFERRED ACTIVITIES DURING OUTDOOR RECESS

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Studies have shown that recess time in schools have the potential to increase children's everyday moderate-to-vigorous physical activity (MVPA). One opportunity to be more active during recess is to go outside and use outdoor facilities, which raised the question of outdoor infrastructure and affordances. Boys and girls have different preferences about what the schoolyard should look like, but most children enjoy natural spaces, markings on the ground, and different types of playgrounds. The aim of this study was to examine what type of activities students like to do in their schoolyard. Students from grades two to six (8–13-year-olds) from four different schools were included in the study. Outdoor recesses were observed by applying the modified SOPLAY system for observing play and leisure in students. In addition, students completed questionnaire about what are three of their favourite activities to do during outdoor recess and what could be different in schoolyard that there would be more opportunities for activities. Three favourite recess activities for boys in both school levels were active games, sports games, and socialising with others. Girls enjoy active games, sedentary activities, and socialising with others. Students at school level II enjoy active games, sports games, and socialising. Students at school level II brought up socialising with others a lot more compared with school level I. A statistically significant difference was found for sports games between genders, and for socialising between school levels ($p < 0.05$). Three most wanted additions to their schoolyard mentioned by students were various climbing facilities, swings, and sport fields. Students' questionnaire responses revealed that boys tend to enjoy more sport-related activities, like sports games and movement games, whereas girls engage more in less active activities, like swinging, and indicate the importance of the social aspect of activities.

Key words: schoolyard, outdoor recess, preferred activities, school children

POSITIVE CORRELATION BETWEEN WHOLE BODY MAXIMAL OXYGEN UPTAKE AND NON-INVASIVELY (NIRS) MEASURED MUSCLE MITOCHONDRIAL POWER

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Since being highly important for overall health and working capacity, the skeletal muscle mitochondria power deserves of being investigated appropriately. However, until recently nearly the single possibility to measure it required invasion into the muscle to remove quite a substantial piece of tissue. Therefore, attempts for creation of indirect methods to estimate skeletal muscle mitochondria power have been made (Ryan et al. 2012). In our present study we have tested how the markers of that way (non-invasively in situ) assessed mitochondria power correlate with whole-body aerobic power measured via expired gas analysis during exhaustive exercise of large muscle groups from the same site. For this particular study, we recruited 11 healthy untrained to moderately trained young adult males (28.1 ± 9.7 yrs; 181.5 ± 6.0 cm; 79.8 ± 14.1 kg). First, we have twice (2 days apart) measured their vastus lateralis respiration capacity with a near-infra-red spectrophotometry (NIRS) during the repetitive occlusions and electrical muscle stimulation protocol adapted from Brizendine et al. 2012. In brief, the measurements started with resting oxygen consumption rate, followed by pressurizing the cuff to 250–260 mmHg to induce blood flow occlusion. After 30 s, with blood flow still occluded, 15 s of 5 Hz stimulation (surface electrodes) with 200 μs biphasic 75 mV pulses (DS7AH, Digitimer, UK) followed. Then, for the estimation of muscular oxygen consumption rate (mVO_2) dynamics, 15 shorter occlusions were run: 5 x 5 s (5 s relief), 5 x 10 s (10 s relief), and 5x15 s (15 s relief). Data were analyzed using Matlab v.9.4 (Mathworks, Natick, MA, USA); mVO_2 was calculated using a linear regression of the downward slope of O_2Hb curve during each of the fifteen (shorter, i.e. 5-15 s) occlusions. Monoexponential function fit was applied to derive time constant and rate constant from those fifteen mVO_2 values. Interclass coefficient of correlation (ICC) for both the major oxygen kinetics parameters (time constant and rate constant) were calculated. Within 1 week, incremental ramp (30 W/min) cycling (70 rpm) test to exhaustion on electrically braked ergometer (Excalibur Sport, Lode) was done to measure whole body aerobic

power as absolute (L/min) and body mass scaled / relative (mL/kg/min) maximal oxygen uptake (VO_2max) by means of gas analyzer (Metalizer 3B, Cortex). With the 15 s of electrostimulation, mVO_2 increased on average by 9-fold, and no less than by recommended minimal 3-fold (Ryan et al. 2012; Southern et al. 2014; Zuccarelli et al. 2020; Hanna et al. 2021) in each of the subjects per total of 22 measurements. Even if the method proved to be valid with reproducible measurements for mVO_2 time constant (ICC = 0.859; 95% CI, 0.632–0.950), it was less so for rate constant (ICC = 0.674; 95% CI, 0.265–0.877), both at similar level as reported by Hanna et al. 2021. There was a correlation detected between the indirect markers of muscle mitochondria power and whole body VO2max: mVO_2 rate constant correlated moderately with relative VO2max ($r = 0.524$, $p < 0.05$) and a trend for rate constant correlated with absolute VO2max ($r = 0.379$, $p = 0.08$). In conclusion, an indirect (NIRS) estimation of m. vastus lateralis mitochondria power correlated moderately with whole body aerobic power measured by the exercise involving large muscle groups including m. vastus lateralis. Moderate correlation is in fact what we had expected since the peripheral (muscular) capacity of oxygen utilization comprises only one of several links in oxygen flow chain within the body.

Key words: muscular oxygen consumption, muscle mitochondria power, young adult

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MUSCLE-BRAIN CROSSTALK

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In this keynote presentation, the concept of muscle-brain crosstalk in older adults, with or without mild cognitive impairment, will be discussed. The global population is experiencing a rapid increase in the proportion of older adults, yet life expectancy has outpaced healthy life expectancy. Notably, the number of older adults with cognitive disorders is growing at an even faster rate than expected from the increase in life expectancy. Pro-inflammatory processes are believed to contribute to cognitive decline and neurodegeneration. Physical exercise triggers the release of anti-inflammatory and neurotrophic factors from muscle tissue, known as myokines, which may have beneficial effects on the brain through direct and indirect mechanisms, indicating the existence of muscle-brain crosstalk. This presentation will provide a detailed description of the ongoing research conducted by the Lithuanian Sports University muscle-brain crosstalk research group led by Prof. N. Masiulis. The assessment of myokine levels, neurometabolism using magnetic resonance spectroscopy, brain structure using magnetic resonance imaging, and cognitive function will be described, as well as the effects of a 12-week resistance exercise program on these parameters. Ultimately, the information obtained from these studies may pave the way for personalized exercise programs that can help slow down or prevent age-related cognitive decline.
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Key words: older adults, myokine levels, muscle-brain crosstalk

THE RELATIONSHIP BETWEEN GAIT SPEED AND RISK OF FALLS IN POSTMENOPAUSAL WOMEN: PRELIMINARY STUDY

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The subject of the relationship between physical fitness and the postural stability in postmenopausal women in the face on demographic changes is very topical. As the population ages, the age-related risk of falls (RF) among older people increases. Falls are major public health problem that poses serious threats to the physical and mental health of older people and is the leading cause of accidental. Gait speed (GS) is a valid measure of physical function in clinical practice. Decreased GS is associated with falls, but studies assessing the relationship between GS and falls in older women are insufficient. Therefore, the aim of this study was to determine the relationship between GS and RF among postmenopausal women. The study involved 67 women (M = 69 years). The evaluation of the postural stability was determined by the balance platform Biodex Medical System SS (version 4.x). The women performed the Fall Risk Test with eyes open were used to measure risk of falling. Moreover, physical fitness was assessed using Gait Speed. In our study, we assessed gait speed using a 6-m walk test. The GS was positively correlated with the RF in postmenopausal women ($p < 0,05$; $r = 0,28$). The results of the study indicated that the GS was positively correlated with the FR in postmenopausal women. As decreased GS is a sign of falls, this can provide a scientific basic for clinicians and rehabilitation therapist for interventions to help to prevent the risk of future falls.

Key words: gate speed, risk of falls, postmenopausal women, postural stability

FUNCTIONAL, MOBILITY, CARDIO EXERCISES EFFECT ON CARDIOVASCULAR SYSTEM, POWER, JOINT MOBILITY IN WORKING AGE PEOPLE

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The purpose of the study was to determine the effects of functional, mobility and cardio exercises on the cardiovascular system, strength and joint mobility in working-age people. Analysis and synthesis of scientific sources, physical fitness tests were performed: hand clenching, reaching with hands behind the back, sitting and reaching. It was found that there was a statistically significant difference in the mobility of people of working age after functional, mobility and cardio exercises, which improved both when assessing leftright hand finger touch behind the back and right-left hand finger touch behind the back. Functional and mobility exercises in combination with cardio exercises effectively improve the mobility, mobility of joints, and endurance of people of working age. Low physical activity has a negative impact on the cardiovascular system: the composition of the body deteriorates, due to the poor mobility of the joints, adequate blood circulation cannot be ensured, the amplitude of movements deteriorates. Emphasizing the need of people of working age for flexibility, muscle strength, endurance, mobility, mobility of the joints, it is appropriate to use preventive functional, mobility and cardio training at least 2 times a week for 45 minutes in order to avoid likely and frequent ligament injuries, back, joint and other pains, overweight problems etc.

Conclusion:

1. After 8 weeks of functional, mobility and cardio exercises, hip volume was signicantly smaller ($p < 0,05$), however KMI results didn't change ($p > 0,05$).
2. After 8 weeks of functional, mobility and cardio exercises, significantly increased subject's pulse while exercising.
3. Functional, mobility and cardio exerciese had positive impact on right hand muscle strenght ($p < 0,05$), but it didn't had impact on left hand strength results ($p > 0,05$).
4. After 8 weeks of functional, mobility and cardio training program, significantly improved subject's lower body mobility ($p < 0,05$), but upper's body mobility didn't change ($p > 0,05$).

Key words: cardiovascular system, joint mobility, strenght, people of working age