The 18th Conference
of Baltic Society of Sport Science

Expanding Horizons in Sport Science and Innovations

ABSTRACT BOOK

April 28–30, 2025
Kaunas, Lithuania


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CONTENT

KEYNOTE SPEAKERS

April 29, 2025
9.30–11.00

PLENARY SESSION I

Room: Conference Hall "ALFA"

Sport Psychology and Performance Outcomes – Breath of Topics, Insights to Practitioners, and Future Directions

Prof. Dr. Marc Lochbaum

Texas Tech University, USA

Sport psychology, as an academic discipline, traces its origins to Carl Friedrich Koch's 1830 publication, Calisthenics from the Viewpoint of Dietetics and Psychology. Since then – and particularly over the past 50 years – researchers have extensively studied psychological factors and sport performance. One effective method, though not without criticisms, for synthesizing this research is meta-analysis, which consolidates findings from published and gray literature to provide concise summaries of the average impact of relationships. Since the 1980s, numerous meta-analyses have quantified the effects of psychological interventions (e.g., goal setting, mental practice), psychological variables (e.g., self-efficacy, flow), and differences within and between athlete successes on various psychological variables (e.g., attributions, mood) on performance outcomes. Notably, the majority of these studies have emerged within the past five years, reflecting growing interest and advancements in the field. My presentation will focus on a brief history of sport psychology, the breadth of meta-analytic topics and general findings, insights into how these findings can inform practitioners, coaches, and athletes, and last, I will offer up future directions pertaining to all aspects of sport science meta-analysis research.

Adapting to Win: Unlocking Potential with Differential Learning

Prof. Dr. Wolfgang Schöllhorn

Johannes Gutenberg University, Mainz, Germany

In the dynamic world of sports, where the margin between victory and defeat is razor-thin, the ability to adapt is a cornerstone of athletic success. Traditional training methods often emphasize repetition and standardization, focusing on achieving consistency through fixed movement patterns. However, modern research reveals that such approaches may limit an athlete's capacity to handle the unpredictability inherent in competitive environments. This lecture introduces Differential Learning (DL), an innovative training paradigm that challenges conventional norms by embracing variability, adaptability, and creative problem-solving as central components of athletic development. DL operates on the principle that the human motor system thrives on variability. By intentionally introducing subtle, randomized changes to training environments, tasks, or movements, athletes are encouraged to explore a broader range of motor solutions. This approach not only enhances skill acquisition but also fosters robustness, enabling athletes to perform effectively under diverse and unforeseen conditions. Unlike traditional drills that seek to eliminate "errors," DL leverages variability as a tool for deep learning, empowering athletes to refine their skills in ways that are both context-sensitive and adaptable.

The lecture will explore the science underpinning DL, drawing on principles from motor control, neuroscience, and biomechanics. Attendees will gain insights into how variability stimulates neuroplasticity and how adaptive problem-solving can elevate athletic performance. Practical examples from sports will illustrate the application of DL in real-world scenarios, showcasing its impact on agility, decision-making, and resilience under pressure.

Moreover, we will discuss how coaches and trainers can integrate this approach into their practice, addressing common challenges such as balancing structure with creativity and tailoring variability to individual athlete needs. Attendees will leave equipped with actionable strategies to design training sessions that go beyond repetition, fostering athletes who are not only skilled but also adaptable and prepared for the unpredictability of competition.

The Role of Physical Education Teachers' Interpersonal Behavior in Students' Optimal Functioning

Assoc. Prof. Dr. Andre Koka

University of Tartu, Tartu, Estonia

Aim of the study: Physical education teachers' interpersonal behaviours, particularly autonomy-supportive versus controlling, significantly influence students' optimal functioning. Grounded in self-determination theory (Ryan & Deci, 2017), this presentation outlines research linking physical education teachers' behaviours to various students' cognitive, social, and behavioural outcomes. Specifically, it addresses variations in motivation, health-related quality of life, physical activity levels, and bullying behaviours, considering bullying both within the school and online contexts.

Results: Research consistently demonstrates that perceived autonomy-supportive teaching from physical education teachers, characterized by offering choices and empathizing with students, enhances students' adaptive outcomes such as autonomous forms of motivation, health-related-quality of life, and overall well-being, primarily via the satisfaction of basic psychological needs. Conversely, perceived controlling behaviours from physical education teachers, such as intimidation, negative conditional regard, and controlling use of praise, frustrate students' basic psychological needs, leading to maladaptive outcomes such as decreased autonomous forms of motivation, lower health-related quality of life, negative emotions, and increased aggressive behaviours including bullying within the school, as well as online. Studies further demonstrate that students' perceptions of autonomy-supportive teaching in physical education positively affects students' leisure-time physical activity intentions and actual behaviour, while controlling teaching has been linked to adverse effects. These findings highlight that physical education teachers' interpersonal behaviours also profoundly impact students beyond classroom contexts.

Conclusions: Overall, fostering autonomy-supportive teaching practices in physical education emerges as critical for enhancing students' holistic development, indicating the necessity of targeted teacher training programs and policy initiatives to promote positive educational outcomes. Directions for future research are briefly discussed.

References:

1. Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York: Guilford.

April 30, 2025
9.00-11.00

PLENARY SESSION II

Room: Conference Hall "ALFA"

A Decade of Coach-Athlete-Parent (C-A-P) Research: Insights, Impact, and Future Directions

Assoc. Prof. Dr. Aušra Lisinskienė

Vytautas Magnus University, Lithuania

The quality of interpersonal relationships between coaches, athletes, and parents (C-A-P) plays a fundamental role in shaping athletes' behavior and developmental outcomes, including biopsychosocial development, personality growth through sports, and long-term participation in sports. C-A-P relationships are particularly significant as they are fundamental, complex, and dynamic. Each individual is different, and different norms and behaviors shape each generation, so this topic remains relevant and highly research-focused. To date, such C-A-P as a whole phenomenon and system has been extensively researched in the past decade; qualitative and quantitative, as well as mixed methods research and intervention programs, positive as well as negative processes in the development of C-A-P relationship measurement were developed by Lisinskiene (2015–2025) and other well-renowned scholars.

In my keynote speech, I will briefly present C-A-P research throughout the decade and the process, progress, and evolution of C-A-P. In addition, I will focus in detail on delivering my latest longitudinal quantitative research study that examines C-A-P over time in a youth sports setting. A most recent qualitative phenomenology research study, in-depth interviews with Olympic and Paralympic athletes on their past C-A-P relationships, will be presented. The future research perspectives on international interdisciplinary research will be discussed, and the practical implications of C-A-P will be outlined.

Research Trends in the Sport Industry Sustainable Development Impact Measurement

Assoc. Prof. Dr. Signe Luika

Riga Stradiņš University, Riga, Latvia

Introduction: In order to promote the sustainable development of the sport industry it must be systematically planned. Effective planning is based on several factors one of which is previously made researches on the development of the sport industry.

Aim of the study: To identify global research trends, key contributors and thematic developments in sport and sustainable development from 2015–2025.

Methods: Bibliometric analyses. Database used: Scopus. Search terms: “sport” AND “sustainable development”. Time frame: 2015–2025. Tools: VOSviewer (network visualization); Bibliometrix R Package (descriptive analytics).

Results: Top contributors in research on sustainable development of sport industry are in Austria, Czech Republic, Denmark, Germany, Ireland, Latvia, Netherlands, Poland, Ukraine. As main contributors include S. B. Morales, D. Tafuri, M. Kucukvar, L. Moustakas. Thematic clusters were identified:
Cluster 1: Governance, corporate social responsibility, Olympic games and physical education.
Cluster 2: Sports tourism and development of environment.
Cluster 3: Sport for development.
Cluster 4: Education and health.
Cluster 5: Sustainable tourism.

Conclusions:

1. Sport industry sustainable development is broadly researched in Europe.
2. Strong collaboration is evident across disciplines, however it mainly remains within one region and is not expressed between regions.
3. A great research focus in sustainable development in sports industry is on tourism which can also be the basis for further research into sustainable development in sports.

Research in Action: Building a More Inclusive Approach to Physical Education

Dr. Vida Ostasevičienė

Lithuanian Sports University, Kaunas, Lithuania

Across the Baltic states, schools are not in a suitable environment for physical education (PE) due to the lack of accessibility and facilities (Selickaitė, 2019). Overall, there is a lack of research on the challenges of inclusive physical education in the Baltic countries (Klavina & Kudlacek, 2011; Jakovleva & Rudzinska, 2024). Nonetheless, this important area of research is being conducted. In this presentation, I review the recent research conducted at the Lithuanian Sports University (LSU) in the field of inclusive PE over the past ten years (2014–2024).

These include interventions to support children with special educational needs, training teachers in adapted physical education, and using interactive technologies in physical education classes through quantitative (descriptive, survey, experimental research), qualitative (case study, narrative research), and mixed-method studies. Our research findings indicate that targeted interventions can significantly improve the emotional and social development of adolescents with behavioral difficulties; the self-efficacy of physical education teachers fosters a more inclusive environment for all; and novel methods can enhance not only the physical and cognitive abilities of children with special educational needs but also encourage their participation in PE.

Building up a workforce to promote inclusive physical education is essential. At LSU, we offer an international Master's program in adapted physical activity, where we make use of national and international expertise for lectures and links with local sport groups who work with people with disabilities. This bridge between research and practice gives the much-needed workforce the confidence, competence, and knowledge needed as part of professional preparation.

Current Trends in Scientific Support for the Training Process in Football

Prof. Dr. Piotr Żmijewski

Jozef Pilsudski University of Physical Education in Warsaw, Warsaw, Poland
Research and Development Center Legia Lab, Legia Warszawa, Poland

The integration of sports science into football has evolved significantly, shaping modern coaching practices and player development strategies. This presentation aims to explore current practices in research and implementation within a professional football club setting, highlighting how scientific support enhances the training process. A key theme is the growing influence of scientific evidence on daily coaching decisions, where collaboration between coaches and sports scientists ensures that training interventions are both context-specific and performance-oriented. One of the most dynamic areas is the contextualized analysis of match and training performance, where understanding situational variables allows for more accurate evaluation of player outputs and tactical behaviors. In addition, effective management of training load, monitoring adaptation processes, and optimizing performance while minimizing injury risk have become central pillars of applied sports science. Particular interest and a notable challenge lie in the assessment and development of cognitive skills, reflecting a shift towards recognizing mental agility, decision-making speed, and game intelligence as critical components of elite performance. Physical preparation is now designed not only to meet general match demands but also to address the specific locomotor and metabolic requirements of distinct positional roles. This involves the use of advanced monitoring tools to track key physical indicators and ensure players are optimally conditioned for competition. A comprehensive approach to diagnostic and implementation services will be proposed, offering a practical model for integrating scientific support into the training process. This approach emphasizes the seamless translation of research findings into actionable strategies, ensuring that sports science remains a driving force behind player development and team success in modern football.

April 29, 2025
11.30–13.00

SCIENTIFIC SESSION I: Oral presentations

Section 1: Sports coaching and performance
Room: Conference Hall "GAMA"

Physiological and Psychological Profiles of Elite 3×3 and 5×5 Basketball Players for Training and Educational Applications

Baranauskienė N.[1], Predkelienė A.[1], Majauskienė D.[1, 2], Lisinskienė A.[1], Daublys D.[3], Dubosienė M.[3], Skurvydas A.[1, 2]

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[2] Vilnius University, Vilnius, Lithuania
[3] Kaunas University of Technology, Kaunas, Lithuania

Aim of the study: Due to the higher intensity and distinct technical-tactical demands of 3×3 basketball compared to the traditional 5×5 format, assessing both physiological and psychological characteristics is essential for game-specific training and athlete preparation. This study aimed to compare the physiological and psychological performance characteristics of elite male athletes competing in 3×3 and 5×5 basketball, to support the development of targeted training and monitoring strategies.

Methods: A total of fifteen professional male basketball players participated in the study, including eight 5×5 players and seven 3×3 players. The following physiological variables were assessed: countermovement jump (CMJ) height, isometric knee extension torque, reaction time, and heart rate variability. Psychological indicators included vigour (Profile of Mood States), intrinsic motivation and amotivation (Sport Motivation Scale), perceived stress (Perceived Stress Scale), depression (Self-Report Scale), and impulsivity (Barratt Impulsiveness Scale).

Results: The results indicated that 5×5 players demonstrated significantly greater CMJ performance ($p = 0.002$), while 3×3 players showed significantly higher levels of vigour ($p = 0.017$) and intrinsic motivation ($p = 0.024$). Although other psychological variables did not reach statistical significance, small to moderate effect sizes suggest potentially meaningful differences between the groups.

Conclusions: These findings highlight the importance of tailoring both physiological and psychological preparation to the specific demands of each basketball format. Further research is warranted to examine how these characteristics influence in-game performance and long-term athlete development.

References:

1. Cabarkapa, D., Aleksic, J., Krsman, D., Cabarkapa, D. V., Philipp, N. M., & Fry, A. C. (2024). The impact of a simulated 3×3 tournament on vertical jump force–time metrics in national team male basketball players. *Frontiers in Physiology, 15*, 1447343. https://doi.org/10.3389/fphys.2024.1447343
2. Ferioli, D., Bosio, A., La Torre, A., Carlomagno, D., & Rampinini, E. (2020). Different training loads partially influence physiological responses to 3×3 and 5×5 basketball games. *Journal of Strength and Conditioning Research, 34*(8), 2351–2359. https://doi.org/10.1519/JSC.0000000000003623

The Impact of Step Frequency Adjustments on Gait Stability in Runners: An Analysis of Feedback-Induced Variability in Movement Patterns

Bernans E.

Riga Stradiņš University, Riga, Latvia

Aim of the study: The study aimed to investigate how modifications in step frequency, induced by auditory and visual feedback, affect gait stability and movement patterns in recreational and trained runners at a constant running velocity.

Methods: Twenty trained/recreational runners (10 male, 10 female) performed 13 treadmill trials (2 minutes each, 5-minute rest) at 12 km/h with 1% slope. Running kinematics (stride time and stride length) were recorded using the OptoJump Next system, and heart rate was monitored (Polar H10). Trials included baseline runs, self-repeats, and frequency manipulations at ±3% and ±6% of each participant's preferred step frequency (PSF), delivered via auditory (metronome) and visual (screen) feedback. Participants received right-leg-specific feedback without being informed of adjustments. A total of 150–190 steps per condition were analyzed. GEM and orthogonal variability were computed to assess gait stability.

Results: Descriptive statistics revealed variation in stride time and length across feedback conditions, indicating that external feedback may influence step frequency regulation. However, ANOVA results showed no significant effects of condition on Goal Equivalent Manifold (GEM) variance or orthogonal variance. This suggests that manipulating step frequency through feedback does not significantly impact underlying stability patterns.

Conclusions: Adjustments in step frequency via external feedback do not significantly affect GEM or orthogonal variability in running at a fixed velocity. These findings suggest robustness in gait control and stability mechanisms despite imposed frequency changes.

The Effectiveness of Verbal Feedback on the Acquisition of Complex Motor Skills in Women's Artistic Gymnastics

Biegajło M., Nogal M., Niźnikowski T.

Józef Piłsudski University of Physical Education, Warsaw, Poland

Aim of the study: The aim of this study was to evaluate the impact of verbal feedback directed at key technical elements on the effectiveness of learning the Yurchenko vault in women's artistic gymnastics.

Methods: The study involved 16 female gymnasts randomly assigned to two groups: an experimental group (EG), n=8, and a control group (CG), n=8. The EG received verbal feedback regarding errors in key elements of the Yurchenko vault, while the CG received feedback on all observed errors across the entire motor task. Expert technical evaluations were conducted at three stages: pre-test, post-test, and retention-test. Kinematic data on joint angles and segmental velocities were collected using the APAS 2000 motion analysis system. Statistical analysis included Welch's t-tests and mixed-design ANOVA.

Results: There were no significant differences between groups in the pre-test. However, the EG achieved significantly higher scores in both the post-test and the retention-test ($p < 0.001$), indicating enhanced motor learning when feedback focused on key technical elements. Kinematic parameters such as joint angles in the preparatory and flight phases correlated with expert scores.

Conclusions: Targeted verbal feedback on key technical elements proved more effective than comprehensive error-based feedback. This approach may enhance the acquisition and retention of complex gymnastic skills by optimizing attentional focus during learning.

Tendencies in the Use of Game Zones and the Effectiveness of Players' Actions in Different Game Formats in the U13 Age Group

Bleidelis I.[1], Luika S.[1], Kolesovs A.[2]

[1] Riga Stradiņš University, Riga, Latvia
[2] University of Latvia, Riga, Latvia

Aim of the study: An athlete's participation in competitions, especially in football, where the number of games in one season can be 50–70, is one of the most important and integral parts of the long-term training process. In this study evaluated tendencies in the use of game zones and the effectiveness of players' actions in the completion zone for the U13 age group between 9vs9 and 11vs11 game formats.

Methods: The players (n = 45), in three teams played two one-day tournaments (game order: C-B, C-A, B-A) using two competition formats. A quasi-experimental design was used to assess the tendencies of the changes in game format. Observational methodologies were employed, to analyse the recordings of six matches by the computer program Lince 2.1, recorded with two VEO Gen.2 cameras, to evaluate the start and end zones of game episodes, including the shots at the opponent's goal.

Results: It was found that the game episodes that started in the confidence zone ended in the completion zone significantly more often in the 9vs9 format (59.2% of episodes) than in the 11vs11 format (20.8% of episodes). Game episodes that started in the forming zone and ended in the forming or completion zone are more common in the 9vs9 format (71.3% of episodes) than in an 11vs11 format (45.1% of episodes).

Conclusions: The results show that there is a significant relationship between the effectiveness of players' actions and reaching the completion zone and the game formats.

The Effect of Local Vibro-stimulation on Road Cyclists

Ciekurs K., Brēmanis A., Ļubinska I.

Riga Stradiņš University, Riga, Latvia

Aim of the study: In sprint distance probably the most important factor for a good result is the athletes' achievements in power of cycling, because the athletes, who ride with a very high frequency, but cannot put in a cycle solid force in competitions. Consequently, is need for new resources or means to increase the strength expressions, to be able to compete successfully with high-level athletes. One of such is the local vibration. In our study we use the local vibration in development of cyclists' strength expressions and power. The aim of study is to determine influence of local vibrostimulation on cyclists peak anaerobic power.

Methods: The subject of study is 15years old 2 cyclists. To carry out experiment, we arranged both cyclists, was made an anaerobic power test, when the athletes were given an unlimited time to warm up and achieve the highest possible power.

Results: Maximum power test results before the local vibro-stimulation showed that the average power of the test group was 906 W, after application of local vibration peak power was 975 W.

Conclusions: A study has confirmed our allegation that application of local vibration can significantly improve the results of sprint cycling. Local vibro-stimulation as an innovative training mean has proved its reliability in training process, as the random-level athletes improve their anaerobic power.

Monitoring Training & Performance in Semi-Professional Female Team Handball During Entire Season

Skarbalius A.

Lithuanian Sports University, Kaunas, Lithuania

Aim of the study: The aim of the research was to find out criteria for coaching monitoring in semi-professional handball players that would create the prerequisites: 1) to achieve the best sports results during the main competitions; 2) to avoid overreaching or even possible overtraining.

Methods: 17 semi-professional female handball players aged 24.9 ± 6.4 years, height 173.6 ± 6.2 cm, body mass 66.2 ± 7.8 kg. were monitored by recording external loads (training minutes, content) and internal loads (RPE, sRPE) during the entire sport season (duration – 9 months). Neuromuscular fatigue was measured before every training session and body composition was measured in the beginning of every microcycle (on Monday before training).

Results: Volume of training: training sessions – 162; matches played – 31; total – 193 workload. Content load (%): warm-up – 24.9 ± 3.5; recovery – 11.3 ± 2.3; integral – 18.7 ± 9.8; physical – 11.4 ± 8.6; technical – 17.9 ± 10.1; tactical – 13.1 ± 8; theoretical – 3.2 ± 7. Countermovement jump as a criterion of neuromuscular fatigue fluctuated – 35.5 ± 2.01 cm. Values describing handball players' internal loads were found (AU): monotony (1,35 ± 0,42) and A:CWR (0,97 ± 0,43).

Conclusions: Bridging the gap between science and practice requires accurate and easy-to-interpret feedback for athletes and coaches (1, 2, 3). The external and internal load criteria applied in the study may be acceptable for managing handball players' sports performance.

References:

1. Kniubaite, A., Skarbalius, A., Clemente, F. M., & Conte, D. (2019). Quantification of external and internal match loads in elite female team handball. *Biology of Sport, 36*(4), 311–316.
2. Lima-Alves, A., Claudino, J., Boullosa, D., Couto, C. R., Teixeira-Coelho, F., & Pimenta, E. M. (2022). The relationship between internal and external loads as a tool to monitor physical fitness status of team sport athletes: a systematic review. *Biology of Sport, 39*(3), 629–638.
3. Skarbalius, A., Vidūnaitė, G., Kniubaitė, A., Rėklaitienė, D., & Simanavičius, A. (2019). Importance of sport performance monitoring for sports organization. *Transformations in Business & Economics, 18*(2), 279–303.

April 29, 2025
11.30–13.00

SCIENTIFIC SESSION I: Oral presentations

Section 2: Physical activity, recreation, and health
Room: Conference Hall "DELTA"

Exploring Constructs of the Recovery-Stress Questionnaire through Factor Analysis

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[2] Józef Piłsudski University of Physical Education, Warsaw, Poland

Aim of the study: The aim of this study is to validate the Recovery-Stress Questionnaire for Athletes (RESTQ-Sport) in Latvian using factor analysis methods.

Methods: A sample of Latvian athletes (n = 300) aged 18 to 25 from various sports completed the questionnaire. The REST-Q. The questionnaire contains 76 questions on 19 scales grouped into four dimensions. There are seven general stress (GS), five general recovery scales (GR), three sport stress (SS), and four sport recovery scales (SR). Answers are on a Likert scale from 0 (never) to 6 (always). Statistical Analysis: Data were analyzed using IBM SPSS version 26 and Microsoft Office Excel. The internal consistency of the scales was evaluated using Cronbach's alpha. Factor analysis (Principal Component Analysis) was performed to assess the underlying structure of the questionnaire and validate its dimensions.

Results: KMO shows moderate suitability for factor analysis (greater than 0.7). KMO is used to check the suitability of the study sample for factor analysis. 2) Bartlet's ($p < 0.05$) Bartlet's test is used to check the suitability of observations for factor analysis. The significance level of the obtained results is less than 0.05. Sample data is suitable for factor analysis.

Conclusions: The Latvian version of the REST-Q shows internal consistency and good factor analysis. (Postdoctoral Grant No. RSU/LSPA-PG-2024/1-0002 'Recovery strategies to improve the performance of martial arts athletes', of project No. 5.2.1.1.i.0/2/24/I/CFLA/005 RSU Internal and RSU with LSPA External Consolidation (financed by the European Union's Recovery and Resilience Mechanism and the budget of the Republic of Latvia)).

References:

1. Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). SAGE Publications Ltd.

Sports Diplomacy: from Understanding to Practical Implementation

Čingienė V.

National Sports Agency, Vilnius, Lithuania

Aim of the study: In the fields of politics, history and international relations, the phrase sport diplomacy has attracted a growing multi-disciplinary interest. Empirical and theoretical bridges should engage the growing organisational interest to operationalise sport diplomacy. A better understanding of sport diplomacy is necessary for sport professionals. It is important to better understand the meaning of sports diplomacy in higher level, grassroot sport diplomacy and sport diplomacy events. The objective of the study is to find out the attitude of Lithuanian sports organisations towards sports diplomacy and to determine its importance in their activities.

Methods: The study was carried out by National Sports Agency under a project funded by the U.S. Government Small Grants Program. The study has been completed in January-February 2025. 83 sports organisations responded to the on-line questionnaire.

Results: Respondents identified their preferred concept of sports diplomacy. Almost half of the respondents identified building trust and fostering productive relations with international partners as the most important goal of sports diplomacy. Building an international image of the organisation is the most important expression of sports diplomacy for organisations. The main reasons for interest in sports diplomacy are to bring people and communities together and to strengthen international relations and cooperation.

Conclusions: Diplomacy through high performance sport, grassroots sport and sport events is being developed in national sports organisations. It is important to deepen and broaden the understanding of sports diplomacy, both through the exchange of best practices and through educational programmes.

References:

1. Parrish, R. (2022). EU Sport Diplomacy: An Idea Whose Time Has Nearly Come. *Journal of Common Market Studies, 60*(5), 1511–1528. https://doi.org/10.1111/jcms.13317
2. Postlethwaite, V., Jenkin, C., & Sherry, E. (2022). Sport diplomacy: an integrative review. *Sport Management Review, 26*(3), 361–382. https://doi.org/10.1080/14413523.2022.2071054

Interrelation of Self-Efficacy, Perceived Stress, Physical Activity, and Sleep Quality Among Sport Educators

Fernate A., Grants J., Vazne Z., Volgemute K., Veliks V., Antapsone E., Steinmane V., Talents D.

Riga Stradiņš University, Riga, Latvia

Aim of the study: The aim of the research is to determine the interrelation of self-efficacy, perceived stress, physical activities and sleep quality of sport educators.

Methods: Participants were 303 sport educators (53% women and 47% men). Following survey data set were selected: General Self-Efficacy scale (GSES), Perceived Stress Scale (PSS), IPAQ and Pittsburgh Sleep Quality Index (PSQI). All instruments are widely used questionnaires and adapted into Latvian. The questionnaire process and collection of respondents' data took place anonymously, in accordance with the Vienna Convention on Human Rights. Mathematical statistics (descriptive statistics and the inferential statistics) were used.

Results: The findings indicate that 24% of sport educators do not participate in vigorous physical activity, whereas 18% engage in such activity twice per week. Additionally, 9% of sport educators report no participation in moderate physical activity throughout the week. In terms of sleep quality, 58% rate their sleep as fairly good, while only 2% consider it very poor. A relationship was observed between sport educators' involvement in moderate and vigorous physical activities and the number of days per week they engage in walking for at least 10 minutes.

Conclusions: The identified link between different intensities of physical activity and frequency of walking suggests these behaviours are closely related. Overall, the results emphasize the need for comprehensive wellness initiatives that support both physical activity and healthy sleep habits among sport educators.

Acknowledgements: The research was funded by the framework of the Plan of the European Union Recovery and Resilience Facility and the State budget grant Nr. RSU/LSPA-PA-2024/1-0009.

Association Between Daily Physical Activity and Functional Capacity of Breast Cancer Survivors: 24 Months Post-Intervention

Klavina A., Liepina S., Bernāns E., Viskinte M.

Riga Stradiņš University, Riga, Latvia

Aim of the study: Breast cancer (BC) therapy is linked to reduced physical capacity, which impairs BC survivors' physical functioning after treatment. Emerging evidence emphasizes the role of regular daily physical activity (PA) in improving functional capacity, alleviating post-treatment symptoms. The aim of this study was to determine the association between daily PA and functional capacity of breast cancer survivors: 24 months post-intervention. The Cancerbeat study (2022–2023) implemented randomized control trial (RCT) investigating the effect of high intensity aerobic interval training (HIIT) on physical health and quality of life in women with stage II-III BC (mean age 48.56, SD =7.84) receiving neoadjuvant chemotherapy. The HIIT group (n=17) performed 2–3 training sessions per week (4x4 min at 85–95% peak heart rate (HR)). The functional capacity was assessed in 24 (HIIT = 13; CG = 11) BC survivors 24 months after intervention.

Methods: Participants performed cardiorespiratory test (VO_2peak), sit-to-stand test, 6 minutes walking test (6MWT), and reported their PA during last 6 months.

Results: HIIT and CG reported light physical activities 1–2 times per week for about 60 min/day during last 6 months. HIIT group had significant correlation between minutes of daily PA and 6MWT outcomes ($r = .620$, $p = .024$), while no significant correlations were found in CG. HIIT group demonstrated significantly higher VO_2peak outcomes ($p= .015$) and 6MWT distance ($p =.041$). Both groups reported significant increase in functional capacity outcomes from pre to 24 months post-intervention (6MWT, 30 s sit-to-stand, absVO_2peak, $p <.05$).

Conclusions: BC survivors have reduced daily PA level, while intervention group presented significantly higher functional capacity level 24 months after intervention.

Aerobic Endurance, Body Mass Index and Blood Pressure of Office Workers

Ķeizāne A., Fernāte A., Mestalo J., Reste J., Vanadziņš I., Andrune D., Silkāne V., Vende-Kotova K., Rīmere N., Marčenko J., Kaļužnaja D., Burčeņa M.

Riga Stradiņš University, Riga, Latvia

Aim of the study: Cardiorespiratory fitness and body fat levels have been linked to mortality from cardiovascular diseases as well as overall death rates. Health problems can affect work performance and subsequently reduce overall productivity, especially when employees are unable to perform at their full potential. Decreased aerobic fitness is linked to a diminished capacity to handle demanding tasks, as it reduces both stamina and effectiveness. The aim of the study is to assess the aerobic endurance, Body Mass Index and blood pressure of office workers.

Methods: 71 office workers participated in the study (89% women and 11% men, with a mean age of 42.2±10.1 years). Data were collected using the 6-Minute Walk Test (6-MWT). The collection of data from the 6-MWT of respondents took place anonymously, with the permission of the Research Ethics Committee of Rīga Stradiņš University. Mathematical statistics (descriptive statistics and correlation) were used.

Results: The results of the 6-MWT study indicate that 88% are healthy people, the average test result ranges from 400 to 700 meters. BMI demonstrated a notably positive correlation with both blood pressure indices – SYS ($r_s = .532$; $p<.01$) and DIA ($r_s = .443$; $p<.01$) and a negative correlation with the distance covered in the 6-MWT test ($r_s = –.242$; $p<.05$).

Conclusions: Maintaining a healthy lifestyle is essential not only to prevent high blood pressure but also to manage existing hypertension.

Acknowledgements: The research was funded by the framework of the Plan of the European Union Recovery and Resilience Facility and the State budget grant RSU/LSPA-PA-2024/1-0013.

Outdoor Recess – Possibility for Forming Lifelong Physical Activity Habits

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Aim of the study: Incorporating various physical activity (PA) options, like outdoor recess, into the school schedule can enhance students' engagement in moderate-to-vigorous PA. Additionally, opportunities for PA in school are crucial for shaping students' attitudes toward PA. Therefore, this study aimed to explore the perceptions of students and their parents on outdoor recess and PA opportunities.

Methods: Students from grades three to six (9–13-year-olds) and their parents responded to a questionnaire about the effect of outdoor recess and opportunities for PA during the school day. Schools were divided into three groups based on the recess opportunities during the school day: (1) "outdoor recess", (2) "outdoor recess on some days", (3) "indoor recess".

Results: Students and parents of the "outdoor recess" group had significantly more positive attitudes about outdoor recess and PA opportunities in school. 53% of students in the "outdoor recess" group stated being active outdoors during leisure-time every day or almost every day, whereas the same indicator for two other groups was 43% and 37%. 75% of parents in the "outdoor recess" group completely agreed that it is beneficial for students to go outside during recess, compared to 60% and 47% of parents in the other groups.

Conclusions: These findings highlight the positive effects of outdoor recess on students' attitudes and behaviours toward PA, potentially fostering lifelong PA habits. Additionally, parents of students in the "outdoor recess" group exhibited more favourable attitudes toward PA, which is crucial as they can influence their children's beliefs about PA.

April 29, 2025
11.30–13.00

SCIENTIFIC SESSION I: Oral presentations

Section 3: Sports psychology and physical education

Room: Conference Hall "ZETA"

The Clock is Ticking: Understanding the Enigma of Academic Procrastination among Undergraduates in University of Ibadan, Nigeria

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University of Ibadan, Nigeria

Aim of the study: Academic procrastination is a common issue among university students, marked by the intentional delay of academic tasks despite awareness of its negative consequences. Procrastination can lead to detrimental outcomes, such as lower academic performance, heightened stress, and increased risks of mental health concerns. This study explores the relationships between self-regulation, self-efficacy, parenting styles, and academic procrastination among undergraduates at the University of Ibadan, Nigeria.

Methods: A correlational survey design was employed, with 400 participants selected through purposive sampling, with a mean age of 21.3 years and a standard deviation of 2.8. Data were collected using a 121-item questionnaire, and ethical approval was granted.

Results: The findings indicated that self-regulation, self-efficacy, and parenting styles collectively predicted academic procrastination ($F(3, 396) = 18.15$, $R = .35$, $R^2 = .121$, $p < .01$). Specifically, self-regulation exhibited a negative correlation with academic procrastination ($r = –.26$, $df = 388$, $p < .05$), while parenting style ($F(3, 396) = 11.91$, $R = .28$, $R^2 = .08$, $p < .01$) significantly predicted procrastination behavior. However, self-efficacy ($r = .12$, $df = 388$, $p > .05$) did not show a significant correlation with procrastination.

Conclusions: The results suggest that a student's ability to regulate their behavior, their perceived self-efficacy, and their parental influence are significant factors in their tendency to procrastinate academically. Based on these findings, it is recommended that universities implement programs to enhance self-regulation skills and offer counseling services aimed at reducing academic procrastination, thus improving both academic outcomes and students' psychological well-being.

References:

1. Munda, X., Thangavel, Tiwari, V. K. (2024). The Impact of Academic Procrastination on Students' Performance in Indian School Education Systems: A Special Research Analysis-Vision 2045. *Journal of Research Education, 2*(1), 1–23.
2. Goyal Y., Mittal V., & Kapoor P. (2024). Understanding Academic Procrastination: Causes, Correlates, and Gender Nuances for Enhanced Self-Regulated Learning *International Journal for Multidisciplinary Research, 6*(1).
3. Dami Z. A., Tameon S. M., & Saudale J. (2020). The Predictive Role of Academic Hope in Academic Procrastination among Students: a Mixed Methods Study. *Pedagogika, 137*(1), 208–229.

The Effect of Different Attentional Focus Instructions on a Basketball Shooting Task in an Intermediate-Level Group

Chaliburda A., Sadowski J.

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Aim of the study: Attentional focus is a one of key factor influencing motor performance and learning. While external focus – directing attention toward the effects of movement – is widely considered superior, particularly among skilled athletes, the effectiveness of internal and mixed focus strategies in novice and intermediate performers remains underexplored. Additionally, prior studies often rely on subjective indicators (e.g., training experience, team affiliation) to determine skill levels, which may compromise the validity of group comparisons. The literature also notably lacks investigations into mixed attentional focus strategies, despite their potential to mirror the dynamic cognitive-motor demands of real-world performance settings. This study examined the effects of different attentional focus instructions – external (E), internal (I), and mixed/switching (S) – on basketball shooting accuracy in objectively classified semi-skilled participants.

Methods: An alternative classification approach was used, based on dual-task performance as an indicator for motor-cognitive automaticity, allowing for more accurate assignment to one of three skill levels. The present analysis focused on the intermediate group (n = 13), who completed shooting tasks from five positions and a standard free-throw test under each focus condition.

Results: Contrary to prevailing findings in the literature, internal and mixed focus cues resulted in higher shooting accuracy compared to external instructions. These results suggest that the advantages of external focus may not generalize across all skill levels and that internal or mixed cues may offer performance benefits for certain populations.

Conclusions: The study underscores the importance of individualized attentional strategies and highlights the need for objective skill classification in motor behavior research.

References:

1. Chua, L. K., Jimenez-Diaz, J., Lewthwaite, R., Kim, T., & Wulf, G. (2021). Superiority of external attentional focus for motor performance and learning: Systematic reviews and meta-analyses. *Psychological bulletin, 147*(6), 618.
2. Wulf, G. (2013). Attentional focus and motor learning: a review of 15 years. *International Review of sport and Exercise psychology, 6*(1), 77–104.
3. Aiken, C. A., & Becker, K. A. (2023). Utilising an internal focus of attention during preparation and an external focus during execution may facilitate motor learning. *European journal of sport science, 23*(2), 259–266.
4. Peh, S. Y. C., Chow, J. Y., & Davids, K. (2011). Focus of attention and its impact on movement behaviour. *Journal of science and medicine in sport, 14*(1), 70–78.
5. Beilock, S. L., Bertenthal, B. I., McCoy, A. M., & Carr, T. H. (2004). Haste does not always make waste: Expertise, direction of attention, and speed versus accuracy in performing sensorimotor skills. *Psychonomic bulletin & review, 11*, 37–379.

Can Specialized Physical Exercise Interventions Improve Preschoolers' Executive Functions and Behavior Regulation? Results From a Lithuanian Kindergarten Study

Dirvanskienė R., Jusienė R., Breidokienė R., Skurvydas A., Majauskienė D.

Vilnius University, Vilnius, Lithuania

Aim of the study: Children who move less and have more screen time are more likely to experience problems with health, behavior, and response inhibition (Shi et al., 2022). It challenges the educational process, family relationships, and the children's emotional well-being (Jusienė et al., 2020; Rakickiene et al., 2021). But can this be reversed with specialized interventions of physical activity? The aim of the study was to investigate the effects of physical exercise programs on the executive functions of 4-6-year-olds.

Methods: The children's cognitive functions and behavior were assessed before and after the 10-week intervention. The preschoolers were assigned into three groups: (1) experimental (E), who performed specialized exercises daily, incorporating aerobic activity and cognitive elements; (2) active control (AC), who performed simple aerobic exercises daily; and (3) passive control (PC), who did not do additional exercises.

Results: 100 preschoolers participated in our study (E N = 35, AC N = 32, PC N = 34). The E and AC groups showed larger improvements on tests that measure inhibition, shifting attention, and cognitive control. The effect sizes for changes in the Head-legs test performance were medium (d = 0.503 (E), d = 0.520 (AC), and d = 0.313 (PC)), and for the changes in the level reached on the Figure School test the effect sizes were medium to high (d = 0.509 (E), d = 0.868 (AC), and d = 0.271 (PC)). Moderate decreases in scores on the SDQ's Social and Behavioral subscales were observed in the AC group (d = 0.355 and d = 0.332), however, non-significant.

Conclusions: We concluded that daily physical activity improves some aspects of preschoolers' executive functions, but no differences were observed between specialized exercises and general aerobic activity.

References:

1. Jusienė, R., Rakickienė, L., Breidokienė, R., & Laurinaitytė, I. (2020). Executive function and screen-based media use in preschool children. *Infant and Child Development, 29*(1), e2173.
2. Rakickienė, L., Jusienė, R., Baukienė, E., & Breidokienė, R. (2021). Pre-schoolers' behavioural and emotional problems during the first quarantine due to COVID-19 pandemic: The role of parental distress and screen time. *Psichologija, 64*, 61–68.
3. Shi, P., Tang, Y., Zhang, Z., Feng, X., & Li, C. (2022). Effect of physical exercise in real-world settings on executive function of typical children and adolescents: A systematic review. *Brain Sciences, 12*(12), 1734.

The Influence of Music in Primary Schools for the Development of Motor Coordination for Seven Year Olds

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Riga Stradiņš University, Riga, Latvia

Aim of the study: Evaluation of the impact of music recommendations in an obstacle course on motor coordination, ability to combine movements for seven-year-old pupils.

Methods: Methods that were used was: analysis of literature sources, control exercises, pedagogical experiment, video analysis, mathematical statistical analysis.

Results: Research hypothesis – If appropriate music will be used in the sports lesson process during the preparation period, the students' coordination of movements and ability to combine movements will be improved, more successfully than in sports lesson processes without music. – is confirmed, as the students in the experimental group with music improved their coordination during the sports lesson and performed on average 5.1% better than the students in the control group without music. All the numbers are also mathematically reliable, as demonstrated by Pearson correlation, and the results from the Student's t-test confirm that the music has shaped the performance of the learners in a significantly different strap for the two groups.

Street Dance as an Integral Tool for Developing Physical Activity, Social Skills, And Mindfulness

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Lithuanian Sports University, Kaunas, Lithuania

Aim of the study: Research aim is to examine the level of physical activity, essential social skills, and mindfulness among adolescents participating in street dance classes, as well as to identify the relationships between these factors.

Methods: In total 63 schoolchildren of 11–16 years of age (of them 7 were boys) took part in this cross-sectional pilot study. Physical activity was measured of 20 subjects by Actigraph devices to evaluate the intensity of street dance sessions (60 minutes). The Essential Social Skills Questionnaire and Mindful Attention Awareness Scale (MAAS) as the self-description inventories were used to assess 6 basic verbal (social) and non-verbal (emotional) communication skills of adolescents' as well as their core characteristic of mindfulness – receptive state of mind in which attention observes what is taking place in a current moment.

Results: The objective physical activity analysis revealed that children achieved mainly moderate intensity (42.2 ± 11.0 min of street dance session time). The total score of essential social skills was significantly greater in girls than boys (3.4 ± 0.3 vs. 3.4 ± 0.6 points, respectively). There were no significant differences between gender groups neither in total nor in averaged MAAS score (53.9 ± 11.3 and 3.6 ± 0.8, respectively). The significant correlations among measured variables were found only between total MVPA (minutes) with ESS component *emotional expression* ($r = –0.45$; $p < 0.05$). After controlling for experience in dancing, gender and age, the correlations were no longer existant.

Conclusions. The study confirms that dance contributes to a healthier and more self-aware younger generation. Therefore, it is recommended to integrate street dance more actively into non-formal education and sports programs for children and adolescents.

Psychological Profile of High-Performance Athletes: A Comparative Study of 3x3 Elite Basketball Athletes and 5x5 Lithuanian Basketball League Players

Lisinskienė A.[1], Predkelienė A. [1], Baranauskienė N. [1], Skurvydas A. [1], Majauskienė D. [1], Domeika A. [2], Guščienė R. [2]

[1] Vytautas Magnus University, Kaunas, Lithuania
[2] Kaunas University of Technology, Kaunas, Lithuania

The aim of the study: This study examines and compares the psychological profiles of Olympic athletes competing in 3×3 basketball and athletes competing in 5×5 basketball within the Lithuanian Basketball League.

Methods: The study involved 15 elite basketball players (7 from 3×3 Olympians and high-performance basketball players and 8 from the 5×5 Lithuanian Basketball League). Psychological assessments included the Big Five Inventory (BFI), Brunel Mood Scale–LTU (BRUMS-LTU), Schutte Self-Report Emotional Intelligence Test (SSREIT), and Barratt Impulsiveness Scale (BIS-11). Psychomotor skills were evaluated using the Pegboard Test, and reaction time was measured with a Reactiometer.

Results: The 5×5 team scored higher in extraversion, mood (except vigor), and impulsiveness, while the 3×3 team excelled in emotional intelligence. The 5×5 team also scored higher across all three impulsiveness dimensions. A multiple linear regression showed that Managing Others' Emotions, Conscientiousness, Non-Planning Impulsiveness, and Neuroticism significantly predicted pegboard performance, $F(4,10) = 25.64$, $p < .001$, explaining 91.1% of the variance ($R^2 = .911$). The model showed good fit (SE = .378; Durbin-Watson = 1.675).

Conclusions: This study highlights distinct psychological characteristics among elite athletes across different basketball formats. Emotional intelligence emerged as a key strength in 3×3 players, while 5×5 athletes exhibited greater mood variability and impulsiveness. Additionally, specific psychological traits strongly predicted psychomotor performance, emphasizing the role of mental factors in elite athletic performance. These insights may support more targeted psychological training and development strategies within basketball.

References:

1. Terry, P. C., Parsons-Smith, R. L., Skurvydas, A., Lisinskienė, A., Majauskienė, D., Valančienė, D., Cooper, S., & Lochbaum, M. (2022). Physical activity and healthy habits influence mood profile clusters in a Lithuanian population. *Sustainability, 14*(16), 10006. https://doi.org/10.3390/su141610006
2. Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology, 51*(6), 768–774. https://doi.org/10.1002/1097-4679(199511)51:6<768::AID-JCLP2270510607>3.0.CO;2-1
3. John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory: Versions 4a and 54* [Technical report]. University of California, Berkeley, Institute of Personality and Social Research.

April 29, 2025

14.00–18.00

SCIENTIFIC SESSION II

Young SCIENTISTS' session: oral presentations

Section 1: Multidisciplinary Research

Room: Conference Hall "DELTA"

Problems of Assessing the Physical Fitness of Children in Kazakhstan

Alikey A.,[1] Otaraly S.[1], Saliyeva A.[1], Marchibayeva U.[1], Andrushishin Y.[2], Gumilyov L. N.[1]

[1] Eurasian National University, Astana, Kazakhstan
[2] Kazakh Sport and Tourism Academy, Almaty, Kazakhstan

Aim of the study: The Aim of the study is to critically analyze the content and normative aspects of the First President's Tests.

Methods: The study utilized fitness testing, analysis of fitness test protocols, and methods of mathematical statistics. To achieve the research goal, we analyzed the protocols of the First President's Tests for male children aged 10–13 years enrolled in basic secondary education institutions in Kazakhstan. For 10-year-old children, the study examined results in the exercises of running 30 m, 500 m, standing long jump, and 1-kilometer cross-country run. For children aged 11–13 years, the analyzed exercises as running for 60 m and 1000 m, long jump from a standing position and pull-ups on a high bar were also analyzed. Assessment and analysis of individual performance indicators were conducted using the standard physical fitness tables for children 9–10 years old and 11–13 years old, as outlined in the Guidelines for taking this battery of tests. In total, data from 972 male children were analyzed. Data analysis. Statistical processing of the study results was conducted using IBM SPSS Statistics, version 27.

Results: The results of the study revealed that the First President's Tests do not meet the necessary requirements for assessment tools, highlighting the need for modifications to their content of this battery of tests.

Conclusions: A revision of the test components is required, as the current assessment tools within the First President's Tests are insufficient for a comprehensive evaluation of the physical fitness of children aged 10–13 years.

Functional Status Assessment and Injury Risk Factor Analysis in Youth Alpine Skiers in Latvia

Ansons R., Dombrovska L., Kļaviņa A., Vārpa N., Reihmane D., Dundurs K. K.

Riga Stradiņš University, Riga, Latvia

Aim of the study: The aim of this study is to identify functional impairments that may increase injury risk among youth alpine skiers aged 18 and under

Methods: Data were collected from 21 student-athletes (mean age: 15.4 years; 13 males and 8 females) from the Sigulda Sports School (Latvia). The assessment included anthropometric measurements (age, sport experience, dominant side, body mass, height, waist and hip circumference), goniometric range of motion (ROM) evaluation using electronic goniometer, isometric muscle strength testing using handheld electronic dynamometer and dynamic stability via the Y Balance Test.

Results: Muscle strength asymmetries between the left and right hip adductors/abductors were present in over 80% of athletes. More than 70% exhibited an H:Q imbalance greater than 30%, indicating elevated knee injury risk. Approximately 30% showed reduced range of motion in the ankle or hip joints. Trunk coordination and lower limb mobility (based on the Y Balance Test) were below normative thresholds in at least one leg in 33% of the athletes. Additionally, 57% had insufficient core strength (less than 3 out of 3 on manual testing).

Conclusions: The findings emphasize the need for regular functional testing and implementation of individualized corrective exercise programs to reduce injury risk and improve physical conditioning in youth alpine skiers.

The Coach - Athlete Relationship in Sport Climbing

Balkaitytė A.

Vytautas Magnus University, Kaunas, Lithuania

Aim of the study: The coach and the athlete share a unique partnership that empowers both of them to reach their individual and shared goals. This study aimed to explore the dynamics of interpersonal relationships between coaches and athletes in sport climbing in Lithuania.

Methods: The qualitative research was conducted through semi-structured interviews with 5 coaches and 5 athletes and analysed using Brown's thematic analysis.

Results: The analysis of the data revealed that both athletes' and coaches' experiences are shaped by positive and negative interpersonal relational processes, and that their relationship is also shaped by specific expectations of the role of coach or athlete. Three themes emerged from the analysis of the athletes' data: positive interpersonal relationship processes, negative interpersonal relationship processes and coach profile. The analysis of the coaches' interviews also yielded three themes – positive interpersonal relationship processes, negative interpersonal relationship processes and the profile of the current generation of athletes.

Conclusions: In summary, the study revealed that the coach-athlete relationship in sport climbing is multi-layered and dynamic. It is formed through trust, openness and cooperation, but can also be influenced by negative factors that emerge in the meeting of different generational views.

The Relationship Between Lower Limb Asymmetry and Performance Among Youth Football Players: Laboratory vs. Field Insights

Bartusevičius D., Stanislovaitienė J., Conte D.

Lithuanian Sports University, Kaunas, Lithuania

Aim of the study: This study aimed to assess the relationships between 1) laboratory- and field-based leg symmetry indexes (LSIs); 2) laboratory- and field-based LSIs and physical and ball-kicking velocity (BKV) performances.

Methods: Twenty-nine male youth on-field football players (age = 14.9 ± 0.9 y, stature = 177.1 ± 7.2 cm, body mass = 64.9 ± 9.8 kg, maturity offset = 1.6 ± 0.9 y) were recruited for the study. Laboratory-based testing included concentric peak torque of the knee extensors and flexors using an isokinetic dynamometer at 60°s-1 and 180°s-1. Field-based testing encompassed the Y-balance (YBT), single-leg countermovement jump (SLCMJ), single-leg long jump (SLLJ), countermovement jump (CMJ), 10-m and 30-m sprints, and BKV. LSIs were calculated for both laboratory- and field-based tests using unilateral tasks. The relationships were assessed using Pearson's (r) and Spearman's rank correlation (ρ).

Results: Results showed trivial-to-small ($p > 0.05$) relationships between laboratory- and field-based LSIs. Furthermore, laboratory- and field-based LSIs showed trivial-to-moderate relationships with physical and BKV performances ($p > 0.05$).

Conclusions: Our findings suggest laboratory and field-based LSIs cannot be used interchangeably, and LSI should not be relied upon as an indicator of physical and technical performance.

References:

1. Maloney, S. J. (2019). The relationship between asymmetry and athletic performance: A critical review. *The Journal of Strength & Conditioning Research, 33*(9), 2579–2593.
2. Peek, K., Gatherer, D., Bennett, K. J., Fransen, J., & Watsford, M. (2018). Muscle strength characteristics of the hamstrings and quadriceps in players from a high-level youth football (soccer) Academy. *Research in Sports Medicine, 26*(3), 276–288.
3. Read, P. J., Oliver, J. L., De Ste Croix, M. B. A., Myer, G. D., & Lloyd, R. S. (2018). A prospective investigation to evaluate risk factors for lower extremity injury risk in male youth soccer players. *Scandinavian journal of medicine & science in sports, 28*(3), 1244–1251.

The Impact of Differential Training on Shooting Efficiency in Young Basketball Players

Burkaitė G., Figueira B., Paulauskas R.

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Aim of the study: Basketball requires training strategies that foster skill development, adaptability, and creativity in diverse scenarios. Variation has long been recognized as a key component of effective teaching and learning, a principle emphasized by the differential training (DT) approach. This study aims to evaluate the effectiveness of DT in improving shooting accuracy under varying constraints.

Methods: A quasi-experimental research design was employed.

Results: Mixed model analyses demonstrated a significant effect of time on 2-point shooting accuracy ($p < .001$), with the experimental group exhibiting greater post-test improvements compared to the control group ($\beta = –2.48$, $p = .042$). These gains were sustained during retention testing ($p = .001$), although a modest decline was observed post-retention ($p = .044$). For 3-point shooting, both groups showed improvement over time ($p = .004$), but no significant differences between groups were found. Game-based performance during 1×1 match play improved significantly across time points ($p < .001$), with numerically greater gains in the experimental group, though not statistically significant. Performance in the 30-shot test was significantly influenced by constraint conditions, with Constraint 1 yielding the highest scores. Accuracy reductions were observed under Constraints 2, 3, and 4 (e.g., Constraint 4 vs. Constraint 1: $\beta = –11.76$, $p = .020$), while session number consistently affected outcomes ($p < .001$).

Conclusions: These findings suggest that DT enhances skill acquisition and retention, supporting its efficacy in optimizing basketball-specific performance over time. Additionally, constraint manipulation primarily impacted shooting performance during extended tasks, with reduced perceptual load under less familiar conditions.

The Change and Relations of The Lower Limbs in Young Basketball Players After Neuromuscular Training

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Lithuanian University of Health Sciences, Kaunas, Lithuania

Aim of the study: To evaluate young age women basketball players lower limbs functional indicators change and relations with neuromuscular training.

Methods: The study involved 10 professional young female basketball players aged between 20 and 35 years. Neuromuscular training was conducted for the period of 4 weeks. Participants were evaluated before and after neuromuscular training program. Analysis of lower limb explosive power measuring (Countermovement Jump (CMJ)) and isometric muscle strength was conducted. Statistical data analysis was conducted using IBM SPSS 30.0. Sample means and standard deviations were calculated. The hypothesis of data normality was tested using the Kolmogorov-Smirnov test. Wilcoxon test was used to test the equality of dependent sample means. Association considered statistically significant at $p<0.05$.

Results: Neuromuscular training had a statistically significant effect on CMJ vertical jump performance and muscle strength. The total score of the CMJ vertical jump test before the neuromuscular training program was 37(22.99: 47.44; 37.41), and after the neuromuscular training program was 39(28.25: 49.60; 39.0910). Comparing the results before and after the neuromuscular training, a statistically significant difference was found ($Z = –2.395$; $p < 0.001$). The total score of the right leg hamstring muscle strength test result before the application of neuromuscular training was 270 (192: 317; 269.9), and after the neuromuscular training was 282 (198: 350; 282.7). When comparing the results before and after the application of neuromuscular training a statistically significant difference was found ($Z = –2.145$; $p < 0.001$).

Conclusions: Based on the study data neuromuscular training has an impact on improving strength and vertical jump performance. Applying neuromuscular training to athletes may reduce the risk of injuries and enhance overall physical preparedness or sport-specific movements.

References:

1. Bonato, M., Benis, R., & La Torre, A. (2018). Neuromuscular training reduces lower limb injuries in elite female basketball players. A cluster randomized controlled trial. *Scandinavian journal of medicine & science in sports, 28*(4), 1451–1460.
2. Ondra, L., Nátěsta, P., Bizovská, L., Kuboňová, E., & Svoboda, Z. (2017). Effect of in-season neuromuscular and proprioceptive training on postural stability in male youth basketball players. *Acta Gymnica, 47*(3), 144–149.
3. Myer, G. D., Ford, K. R., Palumbo, O. P., & Hewett, T. E. (2005). Neuromuscular training improves performance and lower-extremity biomechanics in female athletes. *The Journal of Strength & Conditioning Research, 19*(1), 51–60.

Demographic and Sport-Related Differences in Competitive Anxiety and Athlete Burnout Among Adolescent Athletes

Dislere B. E., Kolesnikova J., Reihmane D.

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Aim of the study: Competitive anxiety and athlete burnout are significant and common psychological conditions that can have a negative impact on an athlete's physical and mental health (Casali et al., 2022, Glandorf et al., 2023). The aim of the study was to investigate the relationship between athlete burnout and competition anxiety scores with various demographic and sports environment variables.

Methods: A cross-sectional study was conducted with adolescent athletes from Latvia. Total sample size included 334 athletes from different sport types, mean ± SD age was 16.0 ± 1.8 years old (43% girls), with 8.2 ± 2.9 years of sports experience. The data was collected at the beginning of the competition season using Competitive State Anxiety Inventory – 2R and the Athlete burnout questionnaire.

Results: Results showed no significant differences in burnout and competitive anxiety scores between specialized and non-specialized athletes. Team sport athletes reported higher emotional and physical exhaustion ($U = 11546.5$, $p = 0.008$), while individual sport athletes showed greater somatic anxiety ($U = 8812.5$, $p < 0.001$). Older youth athletes have a more pronounced feeling of reduced sense of accomplishment ($\rho = 0.203$, $p < 0.001$) and sports devaluation ($\rho = 0.150$, $p = 0.006$). Girls exhibited higher somatic ($U = 8086.5$, $p < 0.001$) and cognitive anxiety scores ($U = 8940.5$, $p < 0.001$), whereas boys demonstrated greater self-confidence ($U = 9378.0$, $p < 0.001$).

Conclusions: Results indicated that the years of sports participation has no statistically significant correlation with athletes' burnout and competition anxiety. Further research should examine causal mechanisms underlying burnout and competitive anxiety differences in young athletes, using longitudinal and intervention designs to better support at-risk groups.

Effect of acute high-intensity training (HIIT) and reduced exertion sprint-interval training (REHIT) on lactate and brain-derived neurotrophic factor (BDNF)

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Aim of the study: Exercise has been linked to neuroplasticity through various mechanisms, with lactate shown to be a potential signaling molecule that causes various neurotrophic factor release in the brain, with Brain derived neurotrophic factor (BDNF) being one of the most researched factors relating to exercise induced neuroplasticity. As exercise intensity affects lactate concentration, comparison of high-intensity training (HIIT) and reduced exertion sprint-interval training (REHIT) could indicate a more optimal protocol for neuroplasticity promotion.

Methods: In this study, 60 participants took part in comparing how acute HIIT and REHIT affect lactate and BDNF levels, while control group watched an educational video. Lactate was measured before and immediately after each intervention in capillary blood, while BDNF was measured in saliva, in the same timeframe. Repeated measures ANOVA was used to analyze time, group and time x group interaction effects.

Results: Lactate showed a group x time interaction effect, where concentration after exercise reached high concentration in HIIT as well as REHIT, 8 and 13 mmol/l, respectively, with no change in control group. BDNF analysis did not show time x group interactions, while group and time effects were observed, with BDNF increasing after HIIT and control groups, but no change was observed for REHIT group.

Conclusions: These findings revealed that intensity and lactate might not be the main mechanisms, while showing significant trends in BDNF change, which should be further tested in a larger sample. These results suggest that exercise can raise BDNF levels, but questions remain on BDNF mechanisms as well as intensity effects.

Branding Model of the Latvian Higher Football League

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Aim of the study: This research integrates brand architecture and brand association theories to examine the role of the league brand in fostering fan support for individual teams. As this paper will demonstrate, professional sports leagues, initially created to entertain spectators, now market their product to four distinct groups: fans, associations, communities, and corporations. The primary objective of this research is to enhance the brand of the Latvian Football League.

Methods: To achieve this, a mixed-methods approach was employed, combining theoretical analysis of sports organisation branding models with empirical research. A quantitative cross-sectional study, using non-probabilistic sampling, was conducted to test the hypothesis that strengthening the link between the league brand and individual club brands would lead to increased interest and value in the league brand. A self-completed online questionnaire was administered to 114 Latvian football fans. Descriptive statistics, including frequencies, percentages, means, medians, and standard deviations were calculated. Cronbach's alpha was used to assess the reliability of the measurement scales. Data analysis was conducted using SPSS statistical software.

Results: This research contributes to the existing literature by empirically demonstrating the influence of league brand characteristics on fan behaviour. While the literature on sports branding often focuses on macro-level analysis, this study highlights the importance of a more nuanced understanding of how league brands impact individual team support.

Conclusions: The findings suggest that a comprehensive sports brand-building model should consider a wider range of factors than those typically examined in the existing literature. By addressing these limitations, future research can provide more practical insights for sports organisations (Aquilina, Chadwick, Chappelet and Hamil, 2012).

Assessment of the Impact of Content Marketing on Consumer Engagement in the Community of Kaunas County Baseball Club "Lituanica" on the Social Network Facebook

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Aim of the study: Aim of the study – to determine the impact of content marketing on consumer engagement in the community of Kaunas County Baseball Club "Lituanica" on the social network Facebook.

Methods: analysis of scientific literature, questionnaire survey (quantitative research) and statistical analysis.

Results: Content marketing has changed a lot over the years, from a basic concept of disseminating information to a strategic approach focused on building relationships with customers (Hollebeek & Macky, 2019). While content marketing was originally defined as the distribution of content digitally, it now encompasses a broader range of activities, including creating and sharing valuable content to attract and retain customers (Lou et al., 2019). The key components of successful content marketing include a variety of formats, such as text, photos, and videos, each designed for different purposes. The content feature can be informational, entertaining, reward-related, or social that caters to a variety of audience needs (Gupta, 2015). Effective content marketing strategies often use a combination of informative and transformative messaging, appealing to both the rational and emotional aspects of the audience. Factors such as relevance, uniqueness, and emotional appeal have a significant impact on the effectiveness of the content (Lou et al., 2019). User engagement is a complex process that includes both emotional and cognitive and behavioral aspects (Kim & Yang, 2017). Users can join communities in a variety of forms, and their motives are also varied, from searching for information to interacting with like-minded people. Research shows that consumer engagement has a positive impact on both consumers themselves and brands, thus strengthening loyalty and promoting overall value creation (Kim & Yang, 2017).

Conclusions: A study found that a photo was the most attractive piece of content, more attractive than videos or text messages. More than half of the respondents rated the content functions of the website very well. Users especially like it when humorous posts are shared. Information about the results of Kauno Lituanica's activities and upcoming plans is also well appreciated. Respondents rated the content strategy of the page very well, and more than two-thirds of the respondents note a very high level of engagement with the content of the website.

References:

1. Gupta, V. (2015). Content marketing: say something; say it well; say it often. *Surat: SR Luthra Institute of Management*, 1–8.
2. Hollebeek, L. D., & Macky, K. (2019). Digital Content Marketing's Role in Fostering Consumer Engagement, Trust, and Value: Framework, Fundamental Propositions, and Implications. *Journal of Interactive Marketing, 45*(1), 27–41. https://doi.org/10.1016/j.intmar.2018.07.003
3. Kim, C., & Yang, S.-U. (2017). Like, comment, and share on Facebook: How each behavior differs from the other. *Public Relations Review, 43*(2), 441–449. https://doi.org/10.1016/j.pubrev.2017.02.006
4. Lou, C., Xie, Q., Feng, Y., & Kim, W. (2019). Does non-hard-sell content really work? Leveraging the value of branded content marketing in brand building. *Journal of Product & Brand Management, 28*(7), 773–786. https://doi.org/10.1108/JPBM-07-2018-1948

Content of Athletic Career Transition Strategies from Youth to Elite Football

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Aim of the study: This study aims to investigate the transition strategies utilized by youth elite football players as they progress to elite professional football. It seeks to identify the critical factors that influence successful integration into higher levels of competition and the challenges faced during this critical career phase.

Methods: The systematic review was conducted using the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) guidelines. The literature review of the review articles was based on a consideration of database Science Direct from 1980 to 2025.

Results: The findings revealed several key strategies that support successful transitions, including the importance of early career planning, mental health support, and the building of a supportive network. he results highlighted several essential strategies for facilitating a successful transition, including the development of mental resilience, adaptability to new environments, and maintaining a strong support system.

Conclusions: The study concludes that a comprehensive transition strategies that includes mental training, skill development, and strong mentorship can enhance the chances of successful integration into elite football. The findings underscore the necessity for football clubs to implement structured support systems that address both the technical and psychological aspects of the transition process.

The Effect of Low Intensity Constant Exercise on Fatigue and Perceived Exertion

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The aim of the study: To analyse how lactate concentration (La), heart rate (HR) and rating of perceived exertion (RPE) relate to fatigue during a 90-minute steady-state exercise test performed at an intensity of 10% above aerobic threshold (AT).

Methods: 13 cyclists aged 28.2 ± 9.3 years participated for a graded incremental test and 90 min constant intensity test at 110% of AT. La, HR, RPE were measured continuously throughout the tests. Fatigue was measured on VAS scale before and after 90 min test.

Results: Subjects were divided into two groups depending on the drift of the heart rate during the 90 min test. In Group 1, where HR, RPE and La decreased or remained the same ($p > 0.05$), and Group 2, where HR, RPE and La increased by more than 4 beats/min during the 90-min test ($p < 0.05$). In Group 2, there was an increase in 80-minute and 90-minute HR compared to 10-minute HR ($p < 0.05$) and the change in RPE was significant ($p < 0.05$) from the 30th minute and increased further until the end of the test ($p < 0.05$). In Group 1, La decreased significantly ($p > 0.05$) at 90 minutes. The mean fatigue level did not change significantly in Group 1, while the change was significant in Group 2.

Conclusions: The change in the Fatigue level was related to the change in RPE during the 90 min test in Group 2, while no relationship was present in Group 1.

The Role of Hockey Clubs in Providing Parental Support for Young Hockey Players

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Aim of the study: Focused clubs' strategies that respond to the changing needs of young players and their families can strengthen family involvement and improve psychological and educational assistance. The aim of this research is to investigate the parents' needs of support from hockey club for delivering parental support in youth hockey.

Methods: Scientific literature analysis, questionnaire, mathematical statistics. 262 parents and guardians (men n = 98 and women n = 164) and 106 coaches (men n = 93 and women n = 13) of young hockey players from several children's and youth hockey clubs voluntarily participate in a custom-designed questionnaire. To find out the parents' view about the parental support in youth hockey, a questionnaire based on the literature background (Grounded theory of parental support by Burke et al., 2023) in youth sport was created. The 20-question questionnaire (Cronbach`s Alpha – 0.738) for parents evaluating the parental support main dimensions: financial, emotional and informational and parents' needs delivering parental support. Questionnaires have acceptable internal consistency and reliable questionnaire survey results 0.70–0.79 (Cohen, Manion & Morrison, 2007). Mathematical statistics (descriptive statistics and inferential statistics (Kolmogorov-Smirnov test; Spearman rank correlation; Cronbach`s Alpha)) were used. Data were processed with SPSS 28.

Results: The higher parents need for psychological and emotional support from the club, the greater the demand for general educational support as well ($r_s = .666$; $p < .01$). Coaches believe that the parents need for psychological and emotional support are interrelated with an increased demand for general education support about sport ($r_s = .606$, $p < .01$) and hockey-specific education support ($r_s = .606$, $p < .01$). Coaches believe that the more hockey plays a central role in the family, the more it becomes a key aspect of the lives of parents and guardians' lives ($r_s = .795$; $p < .01$).

Conclusions: Youth hockey clubs can use recent research insights to better support young athletes by adopting focused approaches that meet the changing needs of players and their families. These may include increasing family involvement through inclusive events, consistent communication about player progress, educational resources on fostering positive parent-athlete dynamics, guidance for parents in interpreting performance, and improved psychological and academic support systems.

References:

1. Burke, S., Sharp, L. A., Woods, D., & Paradis, K. F. (2023). Advancing a grounded theory of parental support in competitive girls' golf. *Psychology of sport and exercise, 66*, 102400. https://doi.org/10.1016/j.psychsport.2023.102400
2. Cohen, L., Manion, L., & Morrison, K. (2007). *Research Methods in Education*. 6th ed. London: Routledge

Effectiveness of an Intervention Program for Physical Education Teachers to Enhance Adolescent Motivation and Physical Activity in Leisure Time

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Aim of the study: Physical education (PE) lessons provide an ideal environment for conveying health-related messages to adolescents. This study examined the effectiveness of a web-based and face-to-face need-supportive intervention program (IP) for PE teachers on students' psychological and cognitive outcomes related to leisure-time physical activity (PA). PE teachers were trained to provide their students autonomy, competence, and relatedness support and to avoid frustrating these needs.

Methods: Based on Ahmadi et al.'s (1) classification system, an 8-weeks long IP for PE teachers was developed. Students (Mage = 12,43; SD = 0,57), assigned either to the experimental group (n = 97) or control group (n =1 45), reported their perceptions of PE teachers' behaviours, psychological needs satisfaction and frustration, autonomous and controlled forms of motivation and PA at baseline and at 1-month follow up. A series of analyses of covariance were carried out to test the intervention effects.

Results: Results revealed no substantial intervention effects on study variables. Therefore, a subgroup analysis was conducted based on baseline self-reported PA levels. Participants were divided into tertiles, and the analyses focused on the lower 33% and upper 33% of students. At 1-month post-intervention, no significant differences were found between the experimental and control groups within the upper tertile. Among students in the lower tertile, those in the experimental group (n = 35) reported significantly higher autonomy need satisfaction and autonomous motivation in PE compared to the control group (n = 57).

Conclusions: This study provides deeper insights for the content of further training for PE teachers to enhance students' autonomy need satisfaction and autonomous motivation.

Velocity Based vs Percentage Based Strength Training in Youth Female Basketball Players

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Aim of the study: The purpose of this study was to compare the effects of velocity-based resistance training (VBRT) and percentage-based resistance training (PBRT) on physical performance outcomes in female youth basketball players over a 17-week intervention.

Methods: Twenty-four players were randomly assigned to either a VBRT or PBRT group. Both groups performed the same resistance exercises, with training loads prescribed based on either real-time bar velocity (VBRT) or fixed percentages of one-repetition maximum (PBRT). Performance testing was conducted at pre-intervention, 4 weeks, and post-intervention (17 weeks). The testing battery included squat jump (SJ), countermovement jump (CMJ), drop jump reactive strength index (DJ RSI), 20 m sprint, modified T-Test, Yo-Yo Intermittent Recovery Test Level 1 (Yo-Yo IR1), and estimated 1RM for squat and bench press.

Results: No significant group-by-time interactions were observed for SJ, CMJ, DJ RSI, 20 m sprint, or Yo-Yo IR1 ($p > 0.05$). Both groups demonstrated significant within-group improvements in the T-Test (VBRT $p = 0.004$, PBRT $p = 0.002$) and in estimated 1RM for squat and bench press ($p < 0.001$). No significant differences were found between VBRT and PBRT for any performance outcomes.

Conclusions: Both VBRT and PBRT are effective training methods for improving strength and agility in female youth basketball players. However, neither showed superiority in enhancing power, sprint performance, or endurance.

References:

1. Banyard, H. G., Nosaka, K., & Haff, G. G. (2021). Reliability and validity of the load-velocity relationship to predict the 1RM back squat. *Journal of Strength and Conditioning Research, 35*(2), 524–529. https://doi.org/10.1519/JSC.0000000000002721
2. Weakley, J. J., Morrison, M. A., Garcia-Ramos, A., et al. (2021). Criterion validity and test-retest reliability of velocity and power measures during jump squats using the PUSH wearable device. *Journal of Strength and Conditioning Research, 35*(5), 1367–1373. https://doi.org/10.1519/JSC.0000000000003238
3. Greig, M., Coull, M., & Morrice, J. (2020). Physical demands of youth basketball: A case for position-specific conditioning. *International Journal of Sports Physiology and Performance, 15*(4), 537–542. https://doi.org/10.1123/ijspp.2019-0325

The Effects of Different Post-Activation Performance Enhancement Protocols on Countermovement Jump Height and Peak Force in Semi-Professional Basketball Players

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Aim of the study: Post-activation performance enhancement (PAPE) has gained attention as a pre-competition strategy to improve performance (1). However, its effectiveness remains unclear (2) Therefore, the aim of this study is to investigate the effects of two PAPE protocols – isometric mid-thigh pull (IMTP) and squat at optimal power load (OP) – on countermovement jump (CMJ) height and peak force in semi-professional basketball players.

Methods: Twelve basketball players (age = 20.1 ± 1.5 years, height 194.5 ± 7.6 cm, body mass 85.3 ± 7.6 kg, fat mass 9.3 ± 3.5 %) completed three testing sessions (Control, IMTP, and OP) in randomized order. CMJ height and peak force were measured at pre-intervention and at 8 and 20 minutes post-intervention.

Results: For CMJ height, no significant main effect of condition ($p = 0.408$, $\eta^2_p = 0.078$), time ($p = 0.758$, $\eta^2_p = 0.025$), or condition × time interaction ($p = 0.370$, $\eta^2_p = 0.091$). For peak force, there was a significant main effect of time ($p < 0.001$, $\eta^2_p = 0.536$), but no significant effect of condition ($p = 0.321$, $\eta^2_p = 0.098$) or condition × time interaction ($p = 0.915$, $\eta^2_p = 0.021$).

Conclusions: Neither protocol improved CMJ performance. Neuromuscular responses to PAPE may be outcome-specific, as time effects were only seen in peak force.

References:

1. Fischer, J., & Paternoster, F. K. (2024). Post-Activation-Performance Enhancement: Possible Contributing Factors. *J Sports Sci Med,23*, 34–45.
2. Rappelt, L., Held, S., Wiedenmann, T., Micke, F., & Donath, L. (2024). Post-activation performance enhancement (PAPE) protocols do not further increase jumping performance beyond warm-up effects: findings from three acute randomized crossover trials. *Front Physiol, 15*, 1447421.

April 29, 2025
14.00-18.00

SCIENTIFIC SESSION II

Young SCIENTISTS' session: oral presentations

Section 2: Technology and Sports Integration

Room: Conference Hall "ZETA"

The Effect of a Pelvic Floor and Deep Core Muscle Strengthening Program on Dynamic and Static Balance In 12–18-Year-Old Bouldering Athletes

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Aim of the study: Bouldering is a young and rapidly growing sport characterized by high demands for stability and coordination. During adolescence, biomechanical changes can impair balance, coordination, and increase the risk of injuries. Although the importance of pelvic floor and deep core muscles for stability is well established, the impact of strengthening these muscles in youth bouldering athletes remains under-researched. Aim of the study – to evaluate the effects of a 12-week pelvic floor and deep core muscle strengthening program on static and dynamic balance in 12–18-year-old adolescents engaged in bouldering.

Methods: The study included 24 adolescents (mean age 15 ± 1.69 years) actively participating in bouldering. Dynamic balance was assessed using the Y Balance Test in three directions for both legs (six measurements total). Static balance was evaluated using the Zebris-FTM platform by analyzing center of pressure (COP) movement parameters.

Results: Improvements in dynamic balance were observed in both the control and experimental groups; however, the experimental group demonstrated better symmetry between the right and left legs. Following the intervention, statistical significant enhancements in static balance were recorded in the experimental group, evidenced by reductions in center of pressure, path length and ellipse area. No significant correlations were identified between static and dynamic balance parameters.

Conclusions: The pelvic floor and deep core muscle strengthening program had a positive effect on both static and dynamic balance in adolescent bouldering athletes and may support adaptation to biomechanical changes during growth.

Effect of Advanced Footwear Technology on Running Economy and Biomechanics in Elite Long-distance Runners

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Aim of the study: To evaluate the effects of carbon-plated running shoes on running economy and biomechanics compared to conventional running shoes, "super-spikes", and barefoot running.

Methods: 14 male and 10 female elite long-distance runners performed 4x5-minute running trials on a motorized treadmill in each shoe condition (submaximal intensity, 10 min rest in between trials). The sequence of shoes was randomized and not disclosed to participants in advance. Physiological data (heart rate, oxygen consumption, RER) and running kinematics (contact phase, step length and frequency) were measured.

Results: Running in advanced footwear technology (AFT) significantly lowered blood lactate levels compared to every other shoe condition ($p < 0.001$). "Super-spikes" showed similar results to carbon-plated shoes but were still less economical, despite their lighter mass factor. An increase in step length and prolonged contact phase were observed during the use of AFT ($p < 0.001$), which aligns with findings from previous studies (1; 2). Barefoot running resulted in increased step frequency and shortened step length ($p < 0.001$). Female runners demonstrated a considerably wider range of individual responses and variability in the results, compared to men, when running in AFT.

Conclusions: Running in AFT primarily affects running kinematics and blood lactate values. The results highlight a clear, positive correlation between shoe design and energy savings, emphasizing a strong scientific basis for the superiority of AFT over conventional running footwear and barefoot running in elite long-distance runners running at self-perceived long-distance race pace.

Isometric Hamstring: Quadriceps Muscle Strength Ratio and Range of Motion in Youth Athletes

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Aim of the study: Lower extremity sports injuries frequently are noticed in youth athletes, as some of the moderating factors, are considered the individuals growth period, shorter weekly practice times, the length of the time as an athlete (1). Low Hamstring:Quadriceps (H:Q) isometric muscle strength ratio can lead to hamstring strains and or ACL injuries in youth athletes (2). The aim of this study was to investigate isometric Hamstring:Quadriceps muscle ratio and active range of motion in youth athletes.

Methods: Participants were 288 youth athletes (girls n = 138, boys n = 150) participating in more 15 different sports, mean age 15.37 years (SD = 1.6), range 13–18 years, with an average of 7.4 years (SD = 2.98) experience in their sport. Data collection was performed in preseason. Active range of motion (AROM) was tested with electronic goniometer (Meloq Easy Angle), and isometric strength of H, Q muscles were tested with electronic dynamometer (Meloq, Easy Force).

Results: Hamstring tightness where AROM was less than 80°, was noted in 24% of the girls in right leg and left leg and 49% for the boys in the right leg and 51% for the left leg. IS H:Q muscle ratio for girls was 0.55 (SD = 0.19) for right leg and 0.51 (SD = 0.17) for left leg, for the boys 0.50 (SD = 0.16) right leg and 0.48 (SD = 0.15) for the left leg.

Conclusions: Prevalence of hamstring stiffness and isometric strength imbalances in youth athletes are concerning, and sport specialists should consider changing preseason conditioning programs to address the issue, as it can minimize risks of sports injuries during the season.

This study is part of the National Research Program “Sports” project titled “Innovations, Methodologies, and Recommendations for the Development and Management of the Sports Sector in Latvia” (IMRSportsLV; No. VPP-IZM-Sports-2023/1-0001).

References:

1. Kamiya, T., Teramoto, A., Otsubo, H., Matsumura, T., Ikeda, Y., Watanabe, K., & Yamashita, T. (2023). Risk factors of lower extremity injuries in youth athletes. *BMJ Open Sport & Exercise Medicine, 9*(1), e001493. https://doi.org/10.1136/bmjsem-2022-001493
2. Diker, G., Struzik, A., Ön, S., & Zileli, R. (2022). The relationship between the hamstring-to-quadriceps ratio and jumping and sprinting abilities of young male soccer players. International *Journal of Environmental Research and Public Health, 19*(12), 7471. https://doi.org/10.3390/ijerph19127471

Changes in the Functional Status of Female and Male Karate Athletes and the Lasting Effect on the Prevention of Ankle Injuries Through a Programme of Stretching, Balance and Proprioception Training Exercises

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Aim of the study: To determine the functional performance of female and male karate athletes change in functional status indices and the residual effect on ankle injury prevention using a program of stretching, balance and proprioception training exercises.

Methods: 2 groups of 25 karate athletes and 2 control groups of 5 karate athletes. Group I: female karate practitioners, group II: male karate practitioners, groups III and IV: control groups of karate female and male who did not receive a physiotherapy. The test was used Functional Movement Score (FMS), The Flamingo test was used to determine static balance, Y-balance test to determine dynamic balance, leg length measurement, and physiotherapy program.

Results: After the dynamic balance assessment, the female group showed an increase in performance ($p < 0.05$), while the male group showed an increase in forward leg reach, inward right leg reach and outward left leg reach ($p < 0.05$). The control groups did not show any changes ($p > 0.05$). After the Flamingo test assessment, the results of the treatment (female) and control (male) groups increased ($p < 0.05$). The results of the female and male control groups did not change ($p > 0.05$). After the functional movement assessment, the subject (female) and control (male) groups showed an increase ($p < 0.05$). The control female and control male group did not change ($p > 0.05$).

Conclusion: after the stretching, balance, and proprioception exercise program, both static and dynamic balance improved, and the risk of injury decreased.

The Effect of Joint Mobilization, Therapeutic Exercises and Cryotherapy on the Function, Pain and Quality of Life in Patients with Shoulder Arthritis

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Aim of the study: The study aimed to evaluate the effect of joint mobilization, therapeutic exercises, and cryotherapy on joint function, pain and quality of life in individuals with shoulder arthritis.

Methods: The study included 30 patients with shoulder rheumatoid arthritis and osteoarthritis, who were divided into three groups: 1) therapeutic exercise group (TE), 2) cryotherapy and therapeutic exercise group (TE + Cryo), 3) joint mobilization and therapeutic exercise group (TE + Mob). Shoulder joint function (DASH questionnaire), pain (SAS scale), range of motion (goniometry), muscle strength (Oxford scale), and quality of life (SF-36 questionnaire) were assessed before and after the intervention.

Results: Shoulder joint function: The study results indicate that therapeutic exercises, cryotherapy, and joint mobilization have a positive effect on shoulder joint function. Statistically significant changes were observed in all outcome measures when compared to baseline ($p < 0.05$), and there were no significant differences between the groups ($p > 0.05$). Pain: Significant changes in pain intensity were observed in all outcome measures when compared to baseline ($p < 0.05$). Statistically significant differences between groups were found between the GP and GP + Krio groups ($p = 0.029$), medium effect size of intervention was observed in the GP + Krio group. Quality of life: The study results indicate that therapeutic exercises, cryotherapy, and joint mobilization have a positive effect on quality of life, but the effect size was small. Statistically significant differences were found in all areas of life, with the greatest changes observed between the GP and GP + Mob groups ($p < 0.05$).

Conclusions: 1) Therapeutic exercises and therapeutic exercises combined with joint mobilization significantly reduced pain, improved upper limb function, and enhanced quality of life in patients with shoulder joint arthritis. 2) Therapeutic exercises combined with cryotherapy had a significant effect on reducing shoulder joint pain and also improved shoulder joint function and quality of life. 3) The combination of therapeutic exercises and cryotherapy was most effective in reducing shoulder joint pain. The combination of therapeutic exercises and joint mobilization was most effective in improving upper limb function, shoulder joint range of motion, and quality of life.

References:

1. Levitsky, A., Kisten, Y., Lind, S., Nordström, P., Hultholm, H., Lyander, J., Hammelin, V., Gentline, C., Giannakou, I., Faustini, F., Skillgate, E., Van Vollenhoven, R., & Sundberg, T. (2019). Joint Mobilization of the Hands of Patients with Rheumatoid Arthritis: Results from an Assessor-Blinded, Randomized Crossover Trial. *Journal of Manipulative and Physiological Therapeutics, 42*, 34–46. https://doi.org/10.1016/j.jmpt.2018.04.007.
2. Klemm, P., Hoffmann, J., Asendorf, T., Aykara, I., Frommer, K., Dischereit, G., Müller-Ladner, U., Neumann, E., & Lange, U. (2022). Whole-body cryotherapy for the treatment of rheumatoid arthritis: a monocentric, single-blinded, randomised controlled trial. *Clinical and experimental rheumatology, 40*(11), 2133–2140. https://doi.org/10.55563/clinexprheumatol/lrff6k
3. Satpute, K., Reid, S., Mitchell, T., Mackay, G., & Hall, T. (2022). Efficacy of mobilization with movement (MWM) for shoulder conditions: a systematic review and meta-analysis. *The Journal of manual & manipulative therapy, 30*(1), 13–32. https://doi.org/10.1080/10669817.2021.1955181

Long Term Effects of Remote High Intensity Aerobic Interval Training on Physical Health in Breast Cancer Survivors

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Aim of the study: To determine the long-term effects of remote high-intensity interval training (HIIT) on physical health outcomes in breast cancer survivors 18 to 24 months post-treatment.

Methods: This longitudinal study included participants from the Cancerbeat project1, with initial assessments conducted pre- and post-neoadjuvant chemotherapy. For the current follow-up, 24 participants were re-evaluated 18–24 months post-neoadjuvant chemotherapy. Participants were divided into a control group (n = 11), which received standard care, and an intervention group (n = 13), which engaged in the 6 months remote HIIT program during neoadjuvant chemotherapy treatment. Physical function was assessed using the 6-Minute Walk Test (6MWT), Sit-to-Stand test at 5x and 30 seconds, and an Incremental Exercise Test.

Results: At 18–24 months post-treatment, the HIIT group showed significantly greater improvements than the control group in endurance 6MWT (48.76 m, 95% CI 11.93, 85.60, ES = .276, p = .012), lower body strength 5xSTS (–1.40 s, 95% CI –2.58, –.21, ES = .233, p = .023), and aerobic capacity VO_2peak (4.29 mL/kg/min, 95% CI 0.99, 8.49, ES = .186, p = .045). Within-group analysis revealed significant improvements ($p < .05$) in 6MWT and 5xSTS in both groups. Additionally, the HIIT group demonstrated significantly higher scores in minute ventilation and the 30second sit-to-stand test at follow-up compared to previous evaluations.

Conclusions: At 18–24 months post-treatment, the HIIT group demonstrated significantly improved cardiorespiratory endurance and lower body strength compared to the control group, suggesting long-term benefits of HIIT for breast cancer survivors.

References:

1. Klavina, A., Ceseiko, R., Campa, M., et al. (2024). The effect of high-intensity interval training on quality of life and incidence of chemotherapy side effects in women with breast cancer. *Integrative Cancer Therapies, 23*, 15347354241297385. https://doi.org/10.1177/15347354241297385

Total Blood Volume and Hemoglobin Mass is Associated with Aerobic Capacity in Elite Junior Rowers

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Aim of the study: to investigate the relationship between total blood volume (BV), Hb mass and aerobic capacity in elite male and female junior rowers.

Methods: Competitive academic rowers (25 males and 14 females) of the Lithuanian junior rowing national team were recruited for the study. Mean age in males and females was 18.4 ± 2.4 & 17.0 ± 1.9 years, height – 1.92 ± 0.50 & 1.77 ± 0.70 m, body mass – 89.26 ± 4.72 & 74.17 ± 11.25 kg, respectively. They completed gradually increasing workload on rowing ergometer (Concept 2), during which pulmonary gas exchange was measured on a breath–by–breath basis using the portable analyzer MetaMax 3B (Cortex, Germany). BV and Hb mass were determined using the CO rebreathing method. Pearson's correlation was calculated to assess the relationships between variables.

Results: Among all the correlations between peak power values during graded rowing test and haematological parameters, only the absolute Hb mass positively correlated with the absolute peak power in male junior rowers ($r = 0.418$; $p < 0.05$). In contrast, only relative Hb mass and BV values positively correlated with relative peak power in female junior rowers ($r = 0.826$; $p < 0.01$, $r = 0.810$; $p < 0.01$). $\dot{V}O2max$ values in both male and female junior rowers moderately and positively correlated with the haematological parameters (correlation coefficients ranging from 0.487 to 0.875).

Conclusions: BV and Hb mass positively correlated with aerobic capacity in elite male and female junior rowers.

Effects of Spatiotemporal Constraints on The Arm Swing Kinematics During Volleyball Serve and Spike Movements

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Aim of the study: To analyse how task and spatiotemporal constraints (3) affect volleyball arm swing kinematics and technique (1).

Methods: Ten female university team volleyball players (aged 18–30) were asked to perform accurate, powerful, and high toss/set (to increase spatiotemporal accuracy demands) volleyball serves and spikes. Kinematic data for shoulder and elbow joints was collected using Noraxon myoMotion inertial movement unit based system.

Results: Adaptation to spatiotemporal constraints (high toss/set) varied across players, with individual kinematic variables aligning more with either power or accuracy condition. 9/10 players used traditional arm swing techniques in a serve and all used traditional techniques for spike. One player switched towards a Circular/Snap technique from a Bow-and-Arrow high, in the high toss condition. There were no differences in the temporal characteristics of the movements between conditions. Except for the maximal external rotation angle ($p < 0,05$) and elbow internal rotation velocity ($p < 0,05$), different angular kinematics are affected by spatiotemporal demands in serve and spike. In these variables, there was either a significant difference (in spike; $p < 0.01$) or a tendency (in serve) for lower values in the accuracy, compared to power condition.

Conclusions: Female student athletes in Lithuania prefer traditional techniques. Demand for higher spatial accuracy leads to lower amplitude of the movement. Powerful spike and serve requires greater joint angles and angular velocities, likely placing a higher strain on the joint (2). In the analysed volleyball movements, increased spatiotemporal demands resulted in changes to angular kinematics, but not temporal characteristics.

References:

1. Giatsis, G., & Tilp, M. (2022). Spike Arm Swing Techniques of Olympics Male and Female Elite Volleyball Players (1984–2021). *Journal of Sports Science & Medicine, 21*(3), 465–472. https://doi.org/10.52082/jssm.2022.465
2. Seminati, E., Marzari, A., Vacondio, O., & Minetti, A. E. (2015). Shoulder 3D range of motion and humerus rotation in two volleyball spike techniques: Injury prevention and performance. *Sports Biomechanics, 14*(2), 216–231. https://doi.org/10.1080/14763141.2015.1052747
3. Tresilian, J. R. (2004). The Accuracy of Interceptive Action in Time and Space. *Exercise and Sport Sciences Reviews, 32*(4), 167–173. https://doi.org/10.1097/00003677-200410000-00008

The Relationship Between Motor Skills, Cognitive Functions and Quality of Life in the Elderly

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Aim of the study: Aging, even in the absence of chronic disease, is associated with a variety of biological changes that can contribute to decreases in skeletal muscle mass, strength, balance (1) and cognitive functions (2). Even with healthy aging diminished physical robustness often lead to physical disability, mobility impairment, falls, and decreased independence and quality of life (2). Aim of the study was to identify and assess the relationship between motor and cognitive function and quality of life in older people.

Methods: A total of 55 elderly took part in the study. Motor function was assessed with the Stand up and Walk, Stand up and Sit down, and hand grip strength tests. Cognitive function was assessed with the Montreal Cognitive Assessment test, the Stroop Effect test and the Trail making test. Quality of life was assessed with the Geriatric Depression Scale and the SF-36 questionnaire.

Results: The results showed that the stronger the leg muscles and the shorter the walking speed, the higher the quality of life scores in physical and psycho-emotional health. A weak association was found between a reaction-focus task and a higher risk of geriatric depression. Depressive symptoms had a statistically significant association with gender, with women having higher levels of depression than men. Age and education had no correlation with quality of life.

Conclusions: There is a medium-strong association among motor, cognitive functions and quality of life in the elderly.

References:

1. Bakhshalipour, V., Khodaparast, S., & Farokhi, A. (2022). Does exercise have a significant effect on the quality of life of sedentary elderly? (Using SF-36 model). *Sport Scientific & Practical Aspects, 19*(1), 11–16.
2. Astutik, N. D., Kuntoro, Indawati, R., & da Costa Fernanndes, A. (2024). Detection of factors that affect the decline in cognitive function that causes dementia in the elderly. *Jurnal Biometrika Dan Kependudukan, 13*(2), 164–173. https://doi.org/10.20473/jbk.v13i2.2024.164-173
3. Irandoust, K. (2024). The Impact of Physical Activity and Nutrition on Cognitive Health and Quality of Life among the Elderly. *International Journal of Body, Mind & Culture, 11*(4), 245–257. https://doi.org/10.22122/ijbmc.v11i4.763

Association with of Problematic Internet Use and Cognitive Abilities in Adolescents with Involvement in Extracurricular Sports

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Aim of the study: The objective of this study was to examine the association between problematic internet use and adolescents' cognitive abilities, with a particular focus on the differential effects of participating in extracurricular sports (ES).

Methods: This research utilized a cross-sectional study design. The study was conducted at general education schools in Riga, Latvia and Jakarta, Indonesia. The study encompassed a total of 257 adolescents, with a mean age of 13.57 years (SD 0.86) and a gender distribution of 47.5% male. The sample included 57 adolescents from Latvia (mean age 13.42 years, SD 0.625) and 200 from Indonesia (mean age 13.61 years, SD 0.918). The Problematic and Risky Internet Use Screening Scale (PRIUSS) was employed to assess problematic internet use (PIU). Additionally, cognitive ability (CA) was evaluated using the Raven Standard Progressive Test. The statistical analysis in this study applied descriptive statistics, Spearman's rho correlation, and a general linear model (GLM).

Results: There was a significant difference (< .001) between extracurricular sports and non-sports groups in CA in Indonesia, in contrast to the results in Latvia where there was only a slight difference in results. The data analysis showed a negative relationship between cognitive ability in Indonesia and Latvia. For CA and PIU, the moderate relationship between CA and PIU in Latvian adolescents was r –.333 (p 0.01). In Indonesia, the relationship between CA and PIU in adolescents is weak, with a correlation of r –.133 (p 0.05).

Conclusions: This conclusive evidence demonstrates that extracurricular sports enhance cognitive ability and mitigate the impact of PIU in adolescents. Further research with a larger sample size and in-depth analyses of the factors that underpin each variable is needed to further confirm these results.

Evaluating Effectiveness of the FiTeens Intervention for Health Behavior Change in Students

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Aim of the study: Previous school-based interventions have addressed adolescent health behaviors such as physical activity during leisure time, screen time, and sleep but have predominantly targeted these behaviors independently rather than simultaneously (Salam, 2016; Oh et al., 2022). The Erasmus+ project FiTeens introduced a digital tools designed to target all three behaviors concurrently using theoretical content, videos, infographics, and interactive tasks (Garcia-Gonzales et al., 2021). This study aims to evaluate the effectiveness of a school-based intervention incorporating FiTeens digital tools to promote physical activity, reduce screen time, and enhance sleep in adolescents.

Methods: Prior to delivering the intervention to 5–9th grade students, teachers will be firstly introduced digital tools. Students will undergo a six-week intervention program comprising lessons delivered by teachers on health-related topics combining behavior challenges provided through the FiTeens smartphone application. Students will complete questionnaires assessing behavioral intentions and motivation related to healthy sleep habits, screen time usage, physical activity, and sedentary behaviors at baseline and in one-, three- and six-months follow-up.

Results: It is expected that students participating in the intervention program will show significant improvements in physical activity levels and sleep quality, as well as a reduction in screen time, compared to students in the control group at one-month, with enduring effects at three-, and six-month follow up.

Conclusions: The intervention based on FiTeens digital tools could have the potential to promote healthier lifestyle behaviors among students by increasing physical activity during leisure time, supporting the effective limitation of screen time and enhancing bedtime routines to improve sleep quality.

References:

1. García-González, L., Abos, A., Sanz-Remacha, M., et al. (2021). *FiTeens: Promoting physical activity and healthy habits in sedentary teenagers*. Servicio de Publicaciones. https://doi.org/10.26754/uz.978-84-18321-95-5
2. Oh, C., Carducci, B., Vaivada, T., et al. (2022). Interventions to promote physical activity and healthy digital media use in children and adolescents: A systematic review. *Pediatrics, 149*(6), e20210538521. https://doi.org/10.1542/peds.2021-053852I
3. Salam, R. A., Das, J. K., Lassi, Z. S., et al. (2016). Adolescent health interventions: Conclusions, evidence gaps, and research priorities. *The Journal of Adolescent Health, 59*(4S), S88–S92. https://doi.org/10.1016/j.jadohealth.2016.05.006

Experts Insights on Digital Bladder Health Solutions: A KOKU Bladder Project

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Aim of the study: Urinary incontinence (UI) is common geriatric syndrome and with the global population steadily aging, it is expected to affect more individuals, placing an increasing financial strain on healthcare systems (Syan & Brucker, 2016; Milsom et al., 2014). While behavioural therapies (Kilpatrick et al., 2020) – such as pelvic floor muscle training, bladder training, and practical strategies – offer benefits, there is a pressing need for innovative approaches to manage UI more effectively, particularly using mobile applications. This is a pilot study for the ongoing KOKU BLADDER research, which has a goal to develop and evaluate an evidence-based digital health programme incorporating behaviour change techniques to improve bladder health in adults aged 50 and over. The aim of this study is to explore expert's insights on digital solutions for bladder health.

Methods: Using a qualitative methodology, we conducted 8 online individual interviews, including researchers, healthcare professionals, and a stakeholder across 3 Worldwide countries (England, Canada and Netherlands).

Results: Key expert's insights for digital solutions for bladder health aligned with older adult's lives emphasize personalization, behaviour tracking, education, adaptive prompts, interactive engagement, real-life support, and intuitive simplicity.

Conclusions: Co-creation is a feasible approach to develop public health interventions, such as interviews that highlight the critical role of UI self-management apps in empowering individuals to monitor and manage their condition effectively. By analysing various applications, it is evident that features such as symptom tracking, personalized recommendations, and integration with wearable devices enhance user engagement and improve health outcomes. Future developments should focus on enhancing user experience, ensuring data security, and incorporating AI-driven insights for better symptom prediction and management.

References:

1. Syan, R., & Brucker, B. M. (2016). Guideline of guidelines: Urinary incontinence. *BJU International*, *117*(1), 20–33. https://doi.org/10.1111/bju.13187
2. Milsom, I., Coyne, K. S., Nicholson, S., Kvasz, M., Chen, C. I., & Wein, A. J. (2014). Global prevalence and economic burden of urgency urinary incontinence: A systematic review. *En European Urology, 65*(1), 79–95. https://doi.org/10.1016/j.eururo.2013.08.031
3. Kilpatrick, K. A., Paton, P., Subbarayan, S., Stewart, C., Abraha, I., Cruz-Jentoft, A. J., O'Mahony, D., Cherubini, A., & Soiza, R. L. (2020). Non-pharmacological, non-surgical interventions for urinary incontinence in older persons: A systematic review of systematic reviews. The SENATOR project ONTOP series. *En Maturitas, 133*, 42–48. https://doi.org/10.1016/j.maturitas.2019.12.010

The Effect of Three-Month Multimodal and Strength Training on Cardiovascular System

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Aim of the study: Aim of the study was to compare changes in cardiovascular system (CVS) indicators during three-month strength training versus multimodal exercises.

Methods: The study involved 30 physically inactive men, divided into two groups: multimodal training (n = 15) and strength training (n = 15). CVS condition was evaluated using the Ruffer physical exercise test (30 squats in 45 seconds). ECG was recorded, and ABP was measured before the test and 2 minutes after it. The second test of the groups was performed after three months of training.

Results: Strength training had a greater impact on HR changes than multimodal training. After 3 months of intervention, HR was lower both during the test and during recovery. Three months of physical exercise had a positive effect on the reduction of ST-segment depression on the ECG (in both groups: after multimodal training, decreased from 0.26 ± 0.04 mV to 0.11 ± 0.02 mV, and after strength training, from 0.48 ± 0.05 mV to 0.27 ± 0.05 mV, $p < 0.05$). Strength training did not significantly affect BP changes. After 3 months of multimodal exercises, significant changes in systolic BP were observed ($p < 0.05$). During test, systolic BP decreased from 151.1 ± 3.2 mmHg to 143.7 ± 2.8 mmHg, and after 1 minute of recovery, from 140.3 ± 3.1 mmHg to 130.1 ± 2.7 mmHg.

Conclusions: Three months of training improved the cardiovascular system's response to physical exertion. Strength training had a greater effect on HR, while multimodal training had a more significant impact on the reduction of systolic BP.

Development of Breathing Exercises Methodology for Reducing Voice Fatigue for Teachers

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Aim of the study: The aim of this study was to develop a structured methodology of breathing exercises aimed at reducing voice fatigue among teachers.

Methods: A mixed-method approach was used, combining a scientific literature review and a questionnaires: Standardized Voice Risk Factor Questionnaire, Vocal Symptoms Scale, Voice Handicap Index (VHI), Perceived Stress Scale, and Pittsburgh Sleep Quality Index (PSQI), which were adopted for use in the Latvian cultural environment and distributed to gather relevant data. Ethics committee approval was obtained, and participants participated in the study voluntarily. The questionnaire was completed by 137 teachers representing various educational levels, providing insight into the prevalence of vocal fatigue and associated symptoms. Comprehensive review of scientific literature was conducted using databases such as PubMed, ScienceDirect and Scopus to identify existing breathing exercises applied in previous studies and their reported outcomes.

Results: Previous studies have shown that breathing exercises can positively affect posture, flexibility, and general physiological function (1), as well as influence vocal performance and sleep quality (2, 3). Based on the analysis of questionnaire responses and literature findings, a new methodology of breathing exercises was developed. The methodology consists of 12 exercises, organized into three functional blocks: relaxation, mobilization and activation. This methodology structure aims to address the specific physiological needs of teachers whose voice use is intensive and sustained throughout the day.

Conclusions: A structured breathing exercise methodology was successfully developed to reduce vocal fatigue among teachers. The next step is to implement an intervention study with teachers who will integrate these exercises into their daily routine for a two-month period to evaluate the method's practical effectiveness.

References:

1. Bruton, A., & Thomas, M. (2011). Breathing therapies in pulmonary rehabilitation: Integrating physiology and evidence. *Physical Therapy, 91*(9), 1348–1357.
2. Csepregi, É., et al. (2022). The effects of breathing exercises on posture and flexibility. *Journal of Bodywork and Movement Therapies, 30*, 225–231.
3. Rocha, L., & Behlau, M. (2018). The relationship between voice and sleep quality. *Journal of Voice, 32*(4), 520.e1–520.e6.

Electroencephalographic Evidence of Inhibitory Control and Neural Processing Differences in Open vs Closed Skilled Athletes

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Aim of the study: In sport neuroscience there is an increasing focus on the cognitive demands of different athletic environments. In particular, open-skill sports – characterized by externally-paced, ever-changing environment have been linked to enhanced executive functions, including inhibitory control, compared to closed-skill sports. Moreover, there have been indications that the playing position of open-skill athletes influences levels of inhibitory control, likely due to varying cognitive and perceptual demands across roles. However, there is a limited number of studies that utilize electroencephalography (EEG) to assess these differences. Therefore, the present study aimed to examine the neural dynamics of inhibitory control in open versus closed-skill athletes using EEG, particularly ERPs, with additional analysis of positional differences among open-skill athletes.

Methods: The participants were 16 right-handed male athletes. Closed-skill athletes were seven track and field athletes. Open-skill athletes were nine basketball players that were assigned in 3 groups (guards, forwards, centers) for further analyses. During the two-color Choice Response Time task (CRT) with simultaneous EEG registration, psychophysiological observation was performed to assess athletes' inhibitory control as well as neural processing.

Results: Statistically significant differences between open and closed-skill athletes were observed in the amplitudes of the N2 and P3 ERP components. Additionally, open-skill athletes exhibited more symmetrical neural activation patterns. Exploratory analyses of neural processing between various playing positions within the open-skill group further revealed variability in neural processing during CRT tasks.

Conclusions: The findings suggest that open-skill athletes have superior inhibitory control and more efficient neural processing compared to closed-skill athletes, with additional variability observed across playing positions.

April 29, 2025
14.00-18.00

E-POSTER PRESENTIONS SESSION

Section 1: Sports coaching and performance
Room: Conference Hall "ALFA"

Age-related peak performance – a comparison between endurance sports on the example of the events of the Tartu Marathon Club in 2024

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Aim of the study: The main parameter influencing athletic performance is the age of peak performance: each sport disciplines has a specific of peak performance age; decline is age-related and variers between sports. The purpose of the present study was to investigate age-related changes in peak endurance performance skier's, runners and cyclists participating in Tartu Marathon Club events.

Methods: data were obtained from the publicly available website of the Tartu Marathon Club at www.tartumaraton.ee. Therelationship between age (at 1-year intervals) and mean finishing time participants was modelled by a regression analysis to find the peak of performance.

Results: The age peak of performance in skiing, cycling and running was 39.2, 27.1 and 36.5 years and performance of the corresponding age 251.3, 212.4, 228.4 min respectively. Age-related decline in endurance performance are specific to the mode of locomotion and began at the earlier age in runners compared to cyclists and skiers. During cycling, the extent of decline in performance with age is less pronounced compared to skiing and running, there are minimal change in cycling time until age 60.

Conclusions: Older people are able to complete marathons of different lengths and durations despite the post-peak decline of performance, which indicates that endurance performance is particularly resilient to the aging effects. The relatively stable average time from the late 20s to the 50s distinguishes cycling from skiing and running, this age-related difference in performance may be due to the specifics of cycling, running, and skiing.

Four Sport Qualification Student Perceived Social Skills

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Aim of the study: In sports industry Thiel et al (2005/06) acknowledge the fact that progress in medical and training science performance management is reaching its limits, therefore, specific social skills of coaches are an important potential for further improvement. The study of foreign languages in higher education establishments is primarily linked to developing graduate social skills. Considering the environment of language learning, Ropa and Malahova (2023) have proposed a novel mode of foreign language learning in tertiary education – synchronous online live classes, which in their opinion could facilitate the steady and continuous development of all language skills. Objectives: 1. To study literature sources about social skills for sport qualification students, 2. To find out differences in self-reported soft skill use by all four sport qualification students, 3. To find differences in sport qualification student self-reported ability to use English confidently in public.

Methods: literature sources analysis, the use of Social skills for University Students (SSUS) questionnaire, consisting of 59 statements (Khampirat et al., 2024). A five-point Likert scale was used for student response. Participants were 154 Riga Stradins University Latvian Academy of Sport Education students. SPSS 20.0 was used to find differences in different qualification student social skills in general and ability to confidently use English in public in particular.

Results: 1. Literature sources testify that social skills are crucially important in all sports industry qualifications. Tsitskari reported that all factors were highly rated by the employers, and there were no differences between industry sectors. 2. This study also did not reveal any differences in social strategy use among sports industry qualifications 3. Analysis of responses to Item No. 3 of the questionnaire showed that sport managers and recreators were more convinced that they are able to speak English confidently in public than sports (PE) teachers.

Breaking Down the Stats: What Drives Success in Youth European Women's Basketball?

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Aim of the study: This study aims to determine which game-related statistics most significantly influence match outcomes in the Under-18 European Women's Basketball Championships, analyzing competitions across both Divisions A and B.

Methods: A dataset of 348 games from the 2022–2024 tournaments was collected from the official FIBA database. Game statistics were normalized per 100 possessions to account for game pace. Using a two-step cluster analysis, matches were categorized as close, balanced, or unbalanced based on final score differentials. A decision tree model (CART) was applied to identify the most predictive variables for game outcomes, and its performance was evaluated using a Receiver Operating Characteristic (ROC) curve and Area Under the Curve (AUC) analysis.

Results: The model identified field goal percentage (FG%), steals, and defensive rebounds (DREB) as the most impactful indicators of team success. Notably, teams with FG% $\geq$ 43% and 17 or more steals demonstrated a substantially higher probability of winning. The model showed high predictive accuracy with an AUC of 0.877.

Conclusions: The findings emphasize the critical role of shooting accuracy and defensive performance, particularly steals and defensive rebounds, in determining the outcome of games at the U18 women's national team level. These insights provide valuable guidance for coaches and federations aiming to optimize training and tactical strategies in elite youth basketball.

Analysis of Transition Offenses between Winning and Losing Teams

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Aim of the study: The paper discusses differences in transition offenses by winning and losing teams in basketball since this explains how they execute transition plays and factors contributing to its effectiveness. In other words, the research problem answers the question of whether any sequence of transition offense strategically proven to be more efficient and more frequently adopted by winning teams. Therefore, the study should find key performance metrics in transition offense that, if correlated, will explain the ultimate game outcome as well as confer possible understanding. Additionally, the study has been appropriately stated to compare speed, efficiency, decision-making, and shot selection in transition offenses between the two groups of teams. The hypothesis of the study is, "Winning teams execute transition offenses more efficiently, and with more accuracy than losing teams."

Methods: Statistical analysis of game footage was based on diverse metrics of measuring transition play success rates. The proposed research methodology was the use of regression analysis in determining the relationship of transition offense execution to team performance.

Results: The major findings reported from the game statistics show that there is no significant difference between the total amount of transition offenses or of other key metrics used for this research.

Conclusions: In sum, the hypothesis that the efficiency of the transition offense is a major factor in the likelihood of success in a basketball game cannot be supported from this particular research.

Training vs. Competition Load in Floorball: Preliminary Insights

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Aim of the study: Floorball can be characterised as an intermittent sport, marked by alternating periods of high-intensity physical exertion and either random or scheduled low-intensity or rest intervals, over a relatively extended duration (typically 1–2 hours). To date, the only known physiological profile of competitive floorball has been described in single study by Kirsilä (2023). The scientific literature provides virtually no information regarding comparative analyses of load intensities between training and competition contexts. This represents a significant knowledge gap that limits the ability to optimise training loads to match competitive demands. This preliminary study focuses on the analysis of floorball training and training load, providing a foundation for developing frameworks for examining competitive scenarios and refining research methodologies.

Methods: Our provisional results show that average duration of regular floorball training is approximately 70–90 min with warm-up period about 25–30 min. High-intensity training periods accounted for approximately 16–18% of the total training time (15–20 min), with the duration of each period ranging from 2 to 3 minutes. The average HR throughout the entire training session was 151 bpm, with the warm-up phase averaging 130 bpm, and the average HR during high-intensity training periods reaching 174 bpm, with HR between high-intensity periods ranging from 150 to 152 bpm.

Results: Our preliminary results suggest that the training load during a typical floorball training session is relatively low and, speculatively, may not meet the physiological demands imposed on players during competitive match situations.

Evaluation of Lithuanian A League Football Matches from the Spectators' Perspective

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Aim of the study: Relevance and Problem: in the digital era, enhancing service quality and spectator experiences is crucial for event success. With audiences often choosing to watch matches at home, organizers must make significant efforts to attract spectators to live events. Spectator satisfaction is a key factor influencing attendance, prompting organizers to improve the on-site experience. Lamberti, Rialp, and Simon (2022) argue that service quality and satisfaction are central to customer engagement and loyalty. Moreover, sports events impact not only the economy but also a city's culture and tourism (Srisiri, 2022). Sponsorship collaborations are also vital, improving engagement through interactive activities (Hsiao, Tang, and Su, 2021). Aim: to evaluate spectators' perceptions of the Lithuanian A Lyga football league and identify factors influencing their assessments.

Methods: a quantitative research approach was used to explore the topic and achieve the research aim.

Results: findings show moderate spectator satisfaction, with significant differences based on age, gender, and attendance frequency. Key factors include stadium infrastructure, team performance, and in-stadium services. Younger spectators prioritized entertainment and digital engagement, while older spectators focused on safety and seating. Emotional attachment to a team enhanced both satisfaction and the likelihood of attending future matches. Service quality correlated strongly with repeat attendance, emphasizing the need for a high-quality event experience.

Conclusions: To increase satisfaction and repeat attendance, Lithuanian A Lyga should improve fan experiences, enhance marketing, and leverage sponsorships. Tailored strategies for different fan types, including rational and ardent fans, will help boost engagement across age groups.

References:

1. Lamberti, G., Rialp, J., & Simon, A. (2022). Antecedents of satisfaction and loyalty in different spectator tribes in a football context. *International Journal of Sports Marketing and Sponsorship, 23*(2), 295–310. https://doi.org/10.1108/IJSMS-07-2021-0120
2. Srisiri, S. (2022). The relationship between participant satisfaction, perceived service quality, and expenditures in a sports event. *ACPES Journal of Physical Education, Sport, and Health (AJPESH), 2*(1), 51–57.
3. Hsiao, C. H., Tang, K. Y., & Su, Y. S. (2021). An empirical exploration of sports sponsorship: Activation of experiential marketing, sponsorship satisfaction, brand equity, and purchase intention. *Frontiers in Psychology, 12*, 677137. https://doi.org/10.3389/fpsyg.2021.677137

Prediction of the Position of Ukrainian Football Clubs in the Ranking UEFA

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Aim of the study: To develop a predictive model for the position of Ukrainian football clubs in the Ranking UEFA up to 2030.

Methods: The performance outcomes of Ukrainian football clubs in UEFA competitions (UEFA Champions League, UEFA Europa League, and UEFA Conference League) over the course of ten seasons were systematically analyzed. The Association Coefficient (AC) was selected as the primary evaluative metric, serving as an indicator of Ukraine's standing in the UEFA national ranking system. To develop a predictive model, regression analysis techniques were employed.

Results: The performances of Ukrainian football clubs in UEFA competitions over ten seasons (2014–2025) were analyzed. The National Association Coefficient (AC) was selected as the evaluation criterion, serving as an indicator of Ukraine's in UEFA ranking. To ensure the quality of predictions for UEFA AC values for the Ukrainian Association of Football (UAF) up to 2030, regression analysis was conducted using IBM SPSS Statistics 29.0. Based on the results of Ukrainian football clubs' performances in UEFA competitions (2014–2015), a linear regression model was calculated.

Linear Regression Equation:
$Y = 971.72 + (-6.776 \times 10^{-8}) \times X$, where:
Y the dependent variable (AC value),
X the independent variable (year).
The coefficient of determination $R^2 = 0.99$. The model is statistically significant, as Fisher's criterion $F = 822.76$ ($P < 0.01$).
Predicted UEFA AC for UAF (2026–2030):
2026 year – AC = 23.08 ± 1.93
2027 year – AC = 20.95 ± 1.95
2028 year – AC = 18.81 ± 1.99
2029 year – AC = 16.67 ± 2.02
2030 year – AC = 14.53 ± 2.05

Conclusions: Using regression analysis, a predictive model of UEFA AC for the UAF for 2026–2030 was developed. The model demonstrates high accuracy, as $R^2 = 0.987$ is close to unity. According to the forecast, AC will gradually decline over the next five years, reaching a value of 14.53 in 2030, which is 60% lower than the AC in the 2024/2025 season. This decline may lead to a decrease in UAF's UEFA ranking from 23 to 32nd place.

References:

1. Csató, L. (2023). Club coefficients in the UEFA Champions League: Time for shift to an Elo-based formula. SSRN. Retrieved March 25, 2025, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4365988.
2. Slivchenko, O. (2023). Dokhody vid UYeFA krytychno vazhlyvi dlia klubiv, osoblyvo z Ukrainy [UEFA revenues are critically important for clubs, especially from Ukraine]. 1927.kiev.ua. Retrieved March 30, 2025, from https://1927.kiev.ua/news/124134-dohodi-vid-uefa-kriticno-vazlivi-dla-klubiv-osoblivo-z-ukraini.
3. UEFA. (n.d.). Official UEFA coefficients. Retrieved March 25, 2025, from https://www.uefa.com/nationalassociations/uefarankings/country/about.
4. UEFA. (n.d.). UEFA Europa League. Retrieved March 30, 2025, from http://www.uefa.com/uefaeuropaleague/index.html.

Evaluation of Fan Engagement in Professional Basketball: The Case of BC "NEPTŪNAS"

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Aim of the study: Relevance and Problem: basketball team success is closely tied to strong fan engagement, which impacts both emotional support and financial performance. Loyal fans with a strong emotional connection to their team contribute to game attendance and long-term sustainability (Funk et al., 2009). Engaged fans often experience greater psychological well-being and community belonging (Wann, 2006). The rise of social media has further transformed engagement, allowing fans to interact and express support digitally, thus strengthening loyalty and attendance (Billings et al., 2017; Kunkel et al., 2014). Effective communication also enhances a team's brand and commercial success (Mason et al., 2015). However, evaluating fan engagement is challenging due to its complexity and various levels of participation (Funk & James, 2001). Aim: to evaluate the factors influencing basketball fan engagement in the case of BC "Neptūnas".

Methods: the study was conducted remotely using an online survey open to all individuals meeting key selection criteria.

Results: the main factors motivating fans to attend BC "Neptūnas" games were emotional connection, game atmosphere, and social interaction. Fans reported strong local identity and emotional involvement. Social media, especially Facebook and Instagram, also played a significant role in enhancing fan engagement and team awareness.

Conclusions: Emotional bonds, community identity, and digital platforms are crucial to fan engagement. Teams should strengthen both in-person and online fan experiences to boost support and long-term loyalty.

References:

1. Funk, D. C., & James, J. (2009). The psychological connection between the sport consumer and the team: The effects of team identification and fan experience on the consumption of sport. International *Journal of Sports Marketing and Sponsorship, 10*(1), 39–53.
2. Wann, D. L. (2006). Understanding the positive social psychological benefits of sport team identification: The team identification–social psychological health model. *Group Dynamics: Theory, Research, and Practice, 10*(4), 272–284
3. Billings, A. C., Qiao, F., Conlin, L., & Nie, T. (2017). Portrayals of pride: The impact of social media on the 2016 Rio Olympics ratings. *Media International Australia, 164*(1), 83–94.
4. Kunkel, T., Doyle, J. P., & Houghton, A. (2014). The role of team identification in predicting consumer behavior in a sport context. *Sport Management Review, 17*(3), 295–310.
5. Mason, D. S., & Zhecheva, M. (2015). The importance of the fan experience in sport management. *Sport Management Review, 18*(4), 422–431.

Effect of Different Muscle Relaxation Techniques on Rectus Femoris Muscle Properties of Volleyball Players

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Aim of the study: There are many benefits to stretching and foam rolling (1, 2). But, which muscle relaxation technique is the best for volleyball players – remains unknown (3). Aim of this research is to find out, which muscle relaxation technique has the biggest effect on rectus femoris muscle length, contraction time (Ts) and maximum muscle belly radial displacement (Dm) of volleyball players.

Methods: Twenty male volleyball players participated in the study. Tensiomyography (TMG) and goniometry were used to measure muscle properties before and after participants performed different muscle relaxation techniques. Participants legs were randomly assigned into 4 groups of different muscle relaxation techniques. Static stretching (SS), ballistic stretching (BS), Proprioceptive Neuromuscular Facilitation Hold Relax (PNF HR) and foam rolling (FR) groups.

Results: When comparing all muscle stretching techniques, a significant difference was found when comparing PNF HR knee flexion Range of Motion (RoM) to SS (Mean difference – 2.6°; $Z = –13.75$; $p = 0.008$) and BS (Mean difference – 4.1°; $Z = –14.00$; $p = 0.007$). PNF HR lacked significance to be better than FR (Mean difference – 0.5°; $Z = 4.85$; $p = 0.350$). No significant difference ($p>0.05$) was found when using TMG. Correlation was not found between TMG and goniometry results (Tc correlation with RoM – $p = 0.484$, $r = 0.915$;), (Dm with RoM – $p = 0.484$, $r = 0.915$;).

Conclusions: PNF HR was the most effective technique in increasing range of motion. It was also the only method to significantly reduce muscle stiffness. No correlation was found between TMG and goniometry.

References:

1. Zvetkova, E., Koytchev, E., Ivanov, I., Ranchev, S., & Antonov, A. (2023). Biomechanical, healing and therapeutic effects of stretching: a comprehensive review. *Applied Sciences, 13*(15), 8596.
2. Wiewelhove, T., Döweling, A., Schneider, C., Hottenrott, L., Meyer, T., Kellmann, M., ... & Ferrauti, A. (2019). A meta-analysis of the effects of foam rolling on performance and recovery. *Frontiers in physiology, 10*, 449926.
3. Konrad, A., Tilp, M., & Nakamura, M. (2021). A comparison of the effects of foam rolling and stretching on physical performance. A systematic review and meta-analysis. *Frontiers in physiology, 12*, 720531.

Preventive Program to Reduce Nonspecific Low Back Pain and Musculoskeletal Discomfort During Prolonged Sitting Among Young People

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[2] Student Science Club "(Un)known spine", Biala Podlaska, Poland

Aim of the study: The study aimed to evaluate the effectiveness of two programs: the Active Break and Active Hamstring Flexibility Exercises in reducing LBP and perceived low back discomfort during prolonged sitting among young people.

Methods: These were a randomized controlled trials with pre- and post-intervention assessment. The participants were recruited based on the following criteria: (1) young people (18−25 years old), (2) with non-specific LBP, (3) with hamstring muscle shortness. Participants were divided into two groups: experimental (active break with the proposed lumbar and hip extension exercises [1], and with active hamstring flexibility exercises with hip flexion mobilization [2]) and control (no intervention). The outcomes were average pain intensity (Visual Analogue Scale, VAS), disability (Oswestry Disability Index, ODI), perceived low back discomfort (LBD) during prolonged sitting (Borg scale), flexibility of the hamstring (Straight Leg Raise Test), and the global perceived improvement (Global Perceived Effect).

Results: VAS, ODI and LBD scores after interventions were significantly lower than those at baseline in the AB group. In the C group, the differences were not statistically significant.

Conclusions: Both studies showed significant improvement in young people with non-specific low back pain. Our findings provide valuable evidence-based practices for managing and preventing low back pain, benefiting individuals, educators, healthcare professionals, personal trainers, and family physicians.

Acknowledgements: This work was supported by the Ministry of Education and Science, Poland, in the years 2023–2024 under the University Research Project at Józef Piłsudski 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].

References:

1. Labecka, M.K., Plandowska, M., Truszczyńska-Baszak, A. et al. (20204). Effects of the active break intervention on nonspecific low back pain among young people: a randomized controlled trial. *BMC Musculoskelet Disord, 25*, 1055. https://doi.org/10.1186/s12891-024-08186-3
2. Plandowska, M., Labecka, M. K., Truszczyńska-Baszak, A., Rajabi, R., & Płaszewski, M. (2024). A Randomized Controlled Trial of Active Stretching of the Hamstrings and Core Control for Low Back Pain and Musculoskeletal Discomfort during Prolonged Sitting among Young People. *Journal of Clinical Medicine, 13*(17), 5048. https://doi.org/10.3390/jcm13175048

Effect of the fatigue during a test on shooting performance

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Aim of the study: We investigated the effect of cumulative lower and upper extremity muscle fatigue during standard exercise conditions: uphill and downhill running (UDR), kayak paddling (KP), and walking in water (WW) on marksmanship performance using uniformed students in a standing, unsupported firing position, lactate accumulation, glucose, and rating of perceived exertion (RPE).

Methods: The research material consisted of twelve female and eighteen male physical education students in the uniformed services fired at targets before and after performing lower and upper extremity exercise bouts performed to volitional fatigue were used as our exercise conditions: (1) uphill and downhill running (UDR), (2) kayak paddlers (KP) and (3) walking in water (WW).

Results: Shooting accuracy, assessed by the number of hits was significantly decreased immediately following three types of exercise and recovered to pre-exercise values within 24 hours.

Conclusions: We conclude that shooting accuracy recovers rapidly in fit students in the uniformed services following fatiguing running, paddlers and walking in water. Our study provides evidence that students can maintain shooting accuracy following exhausting swimming, running and rowing.

Evaluating the Impact of Leg Fractures on NBA Players Performance: A Comparative Study of Pre- and Post-Injury Metrics

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Aim of the study: Leg fractures represent a significant challenge for professional basketball players, potentially impacting performance and career longevity. With advancements in sports medicine and rehabilitation, many athletes now return to competition at high levels. This study aims to evaluate the impact of leg fractures on the performance of National Basketball Association (NBA) players by comparing key performance indicators before and after injury, thereby assessing the extent and timeline of functional recovery.

Methods: A retrospective cohort of 19 NBA players who sustained leg fractures between 2003 and 2025 was analyzed. For each athlete, performance data were collected and averaged across 3, 5, and 10 games pre- and post-injury. Variables included minutes played, points per game, field goal and free throw efficiency, three-point shooting, rebounds, assists, steals, blocks, turnovers, and personal fouls. Statistical analysis was performed using paired sample t-tests to determine significant changes in performance.

Results: Findings revealed a minor, non-significant reduction in playing time and shooting efficiency during the initial three games post-return. However, by the 10-game mark, most performance metrics had returned to baseline or improved. Notably, free throw percentage and assist rates showed consistent post-injury improvement, suggesting successful physical and tactical adaptation.

Conclusions: NBA players demonstrate a strong capacity to recover and maintain performance following leg fractures. These results underscore the effectiveness of contemporary rehabilitation and training protocols and provide a positive perspective for teams and clinicians managing post-injury return-to-play strategies.

References:

1. Jakoi, A., Freidl, M., Old, A., Javandel, M., Tom, J., & Realyvasquez, J. (2012). Tibial tubercle avulsion fractures in adolescent basketball players. *Orthopedics, 35*(8), 692–696. https://doi.org/10.3928/01477447-20120725-07
2. Podlog, L., & Eklund, R. C. (2010). Returning to competition after a serious injury: The role of self-determination. *Journal of Sports Sciences, 28*(8), 819–831. https://doi.org/10.1080/02640411003792729
3. Sarlis, V., Papageorgiou, G., & Tjortjis, C. (2023). Sports Analytics and Text Mining NBA Data to Assess Recovery from Injuries and Their Economic Impact. *Computers, 12*(12), 261. https://doi.org/10.3390/computers12120261

The Effect of a Ball Mastery Training Mat on Young Players' Football Technique

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Aim of the study: Football academies emphasize the importance of developing fundamental individual techniques as a key aspect of youth training programs (1). Effective skill development in young players requires increased ball interaction time. However, traditional training alone may not be sufficient. To enhance skill acquisition, innovative and engaging home-based training solutions are essential. Aim of this study evaluate the effect of guided home-based training using the FPRO Ball Mastery Training Mat on young players' technical skills.

Methods: Forty-eight football players (aged 8–9) were randomly assigned to one of three groups: training with the Ball Mastery Mat (FPRO, n = 16), training without a mat (BMT, n = 16), or a control group (CONTR, n = 16). The experimental groups trained for 20 minutes daily over three months, while the control group received no additional training. Players completed pre- and post-training assessments, including two ball mastery tests (V-Shape and L-Shape) and two football technique tests (Dribbling and Turn).

Results: Both the FPRO and BMT groups showed significant improvements in the V-Shape and Dribbling tests ($p < .001$). However, only the FPRO group improved in the L-Shape and Turn tests ($p < .001$), while the BMT group showed no change ($p > .05$). The control group had no significant improvements ($p > .05$).

Conclusions: Home-based training improved football technique, with the FPRO mat providing greater benefits than training without a mat. These findings highlight the effectiveness of structured at-home training using a mat with visual and tactile cues to enhance young players' skills.

References:

1. Sulistiyono, S., Sumaryanto, Sumarjo, Ngatman, Primasoni, N., & Yudhistira, D. (2024). Longitudinal analysis of physical abilities and fundamental skills among the Real Madrid Foundation UNY football players. *Pedagogy of Physical Culture and Sports, 28*(3), 184–191.

The Influence of Engagement on Young Volleyball Players' Intentions to Withdraw from Sport: The Mediational Effect of Coach Effectiveness and Indifference Coaching

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Aim of the study: The purpose of this study was do determine if athletes perceived coach effectiveness and indifferent coaching mediates the relationship between athletes engagement and intentions to withdraw from sport.

Methods: A cross-sectional research design was used to collect the data. An online questionnaire surveys were administrated to 317 Lithuanian volleyball players aged 12–19 years (121 male athletes and 196 female athletes). The anonymous questionnaire used in the study consists of five parts: demographic data; athlete engagement in sporting activities; the athlete's perceived effectiveness of the coach's performance; need indifference coaching; intentions to withdraw from sport. Hierarchical regression analysis was performed using the SPSS macro PROCESS (Module 6) software by Hayes (2013) to assess the direct and indirect relationship between variables. Bootstrapping was used to examine the mediational effects.

Results: The study revealed, that engagement had a direct negative effect on intentions to withdraw from sport. There was a significant indirect effect of engagement on intentions to withdraw from sport through two serially mediating variables: perceived coaching effectiveness and need indifference coaching.

Conclusion: The results demonstrates that higher engagement reduces intentions withdraw from sport, while perceived lower coach effectiveness and higher need indifference coaching encourages young volleyball players to have negative experiences in sport and increase to athletes' intentions to withdraw from sport. The results of the study contribute to a better understand of what young athletes experience and how they interpret the experience of sports education.

References:

1. Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.

Dynamics of Physical Fitness and Stress in Young Football Players Before the Competitive Season

Jančiauskas R., Kontautienė V., Beniušienė A., Šarkauskienė A., Misiūnas E.

Klaipeda university, Klaipėda, Lithuania

Aim of the study: High sports results are achieved only by purposefully developing the physical characteristics of young football players, systematically improving technical-tactical actions, and purposefully assessing the importance of each complex component and its influence at various stages of athlete training (Chaeroni et al., 2024). It is especially important to assess how physical activity affects the young athlete's body physically and emotionally. The increasing intensity of training in modern sports programs requires accurate and objective indicators that help monitor not only physical fitness, but also stress dynamics. Therefore, this study aims to assess the physical fitness indicators and stress changes in young football players aged 11–13 years before the competitive season.

Methods: The study was conducted at the Klaipėda Football Academy (KFA) in August 2024, before the competition season. The study involved 47 young football players (11–13 years old), who trained three times a week and participated in competitions on weekends. The following methods were used: physical activity was monitored with POLAR heart rate monitors, the number of steps per day and calorie consumption per day were assessed; stress was assessed by the amount of cortisol in saliva (morning and evening), the tests were performed by the Mariners' Polyclinic laboratory; hand strength was measured with a dynamometer, high jump – OPTOJUMP platform; reaction speed was assessed with an RA-1 reaction meter. Height (cm) and weight (kg) were measured.

Results: The average number of steps ranged between 15,000 and 19,000 per day, with the highest physical activity recorded in the middle of the week. Calorie intake corresponded to activity, highest on Wednesday (~1892 kcal), during intensive training. Stress levels (cortisol levels) also increased in the middle of the week and decreased during the weekend. Average hand strength – 26.4 ± 8.5 kg, average high jump – 26.7 ± 4.3 cm. Average reaction speed – 213 ± 51.6 ms. Most (74.5%) of young football players achieved an average level of results in the hand strength test, but the reaction speed results of the majority (63.8%) of the subjects did not reach the average level, which indicates the need for additional training. The majority (68.1%) of high jump (sudden force) results were at a low level, and only a small part of participants (19.1%) reached the average level.

Conclusions: Young football players demonstrate sufficient physical activity, but it is necessary to strengthen explosive strength and develop reaction. The observed fluctuations in stress levels allow us to assume the influence of training load on the emotional state of athletes. Systematically organized studies of physical fitness and stress dynamics of young football players can provide coaches with a lot of valuable information on how to more effectively manage the sports training process and apply individualized load planning and ensure adequate rest during the week

April 29, 2025
14.00–18.00

E-POSTER PRESENTIONS SESSION

Section 2: Physical activity, recreation, and health
Room: Conference Hall "GAMA"

Correlation of Physical Activity Level to Strength of Depressive and Anxiety Symptoms

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Aim of the study: The study aimed to investigate correlations between physical activity level and the severity of depressive and anxiety symptoms in adults residing in Latvia.

Methods: A total of 170 respondents completed questionnaires assessing physical activity levels and mental health status. After applying inclusion criteria, 110 participants aged 23 to 50 were included in the final analysis. The study utilised validated self-report questionnaires to assess physical activity (GPAQ -measured in METs) and the severity of depressive and anxiety symptoms (PHQ-9 and GAD-7). Statistical methods were used to determine the relationship between these variables.

Results: Most respondents (86.36%) reported moderate to high physical activity levels. Low activity (0–599 MET) was reported by 13.64% of participants, moderate activity (600–1499 MET) by 17.27%, and high activity (≥ 1500 MET) by 69.09%. Symptoms of depression and anxiety were most severe in individuals with low physical activity levels. Mean depression and anxiety scores were highest in the low activity group (11.73, SD 3.94; and 8.47, SD 5.67, respectively) and decreased with increased activity. A statistically significant relationship was found between physical activity level and the severity of depressive and anxiety symptoms, particularly when comparing low and high activity groups.

Conclusions: The findings indicate a significant inverse relationship between physical activity levels and the severity of depressive and anxiety symptoms. Higher physical activity is associated with reduced symptoms, highlighting its potential as a preventive and therapeutic measure for mental health conditions.

References:

1. Schuch, F. B., Vancampfort, D., Firth, J., et al. (2018). Physical activity and incident depression: A meta-analysis of prospective cohort studies. *American Journal of Psychiatry, 175*(7), 631–648. https://doi.org/10.1176/appi.ajp.2018.17111194
2. Stubbs, B., Vancampfort, D., Rosenbaum, S., et al. (2017). An examination of the anxiolytic effects of exercise for people with anxiety and stress-related disorders: A meta-analysis. *Psychiatry Research, 249*, 102–108. https://doi.org/10.1016/j.psychres.2016.12.020
3. Rebar, A. L., Stanton, R., Geard, D., et al. (2015). A meta-meta-analysis of the effect of physical activity on depression and anxiety in non-clinical adult populations. *Health Psychology Review, 9*(3), 366–378. https://doi.org/10.1080/17437199.2015.1022901

Informative genetic markers associated with physical performance in Lithuanian elite athletes

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Aim of the study: We aimed to identify and characterize informative genetic markers associated with physical performance and health among Lithuanian elite athletes.

Methods: The study involved 200 elite Lithuanian athletes and 210 sedentary control individuals. Athletes were categorized into two groups: endurance (aerobic capacity), sprint-power (anerobic capacity). Athletes were evaluated for anthropometric measures, physical development, and functional performance indicators. Candidate genes essential for athletic performance (affecting cardiovascular, respiratory, muscular, metabolic, and homeostatic functions) and their 26 established genetic markers – Single Nucleotide Polymorphisms (SNPs) were selected for this research via literature and bioinformatics analyses. DNA was extracted from peripheral blood leukocytes. Genotyping was performed using RFIP analysis or RT-PCR. Significant SNPs associations with athletic status were further analyzed for genotype-phenotype relationships and validated via meta-analysis.

Results: The athletes, carriers of the ACTN3(RR), CKM rs8111989(AA), ACE(DD), NOS3 rs2070744(TT), PPARA rs4253778(CC), AMPD1 rs17602729(CC), BDNF rs6265(CT), HIF1A rs11549465(CT), AGT rs699(TT), AGTR1 rs5186(CC), GPC5 rs852918(GG), MPRIP rs6502557(AA) genotypes have better ability to achieve high muscle capacity indexes when exercising short-term explosive muscle power tasks. The athletes, carriers of the GDF5 rs143383(GG), AGT rs699(CC), AGTR1 rs5186(AA), AGTR2 rs11091046(CC), ACE(DD), MB rs7293(GG), MSTN(delA), TFAM rs1937(CC), PPARGC1A rs8192678(GG), PPARA rs4253778(GG), NOS3 rs2070744(CC) typically have better aerobic capacity and associated with endurance athlete status.

Conclusions: Our findings provide support for an association of 12 SNPs with endurance status and 11 SNPs with sprint-power status in Lithuanian athletes. To ensure reliability of results, identified associations should be replicated across different athlete populations, incorporating a broader range of phenotypic trait.

Impact of Smoking on Acute Structural and Functional Changes in the Triceps Surae Muscle-Tendon Unit Following Exercise-Induced Fatigue

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Aim of the study: This study investigates how smoking influences acute adaptations in the calf muscle-tendon unit following exercise-induced fatigue.

Methods: Using ultrasound imaging, isokinetic dynamometry, and functional performance tests, we compared smokers and non-smokers.

Results: Our findings reveal that smokers exhibited greater post-exercise muscle thickening, increased tendon echogenicity, and higher stiffness, but poorer functional performance, suggesting compromised tissue adaptability. These results underline the importance of personalized rehabilitation strategies for smokers to prevent long-term musculoskeletal decline.

Factor Analysis of Sport Science Student Social Skills

Jakovļeva M., Rudzinska I., Jakovļeva G.

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Aim of the study: study literature sources about European sports industry needs (1); find out most important factors in sport student social skill development self-response Social Skills of University Students (SSUS) questionnaire (2), find general tendencies of social strategy use and differences in strategy use between genders, study years, full and part time students.

Methods: SPSS 20.0 was employed to perform factor analysis of SSUS questionnaire, consisting of 59 statements with a five-point Likert scale, descriptive and conclusive statistics were used to determine central tendencies of social skill development. Participants were 154 Riga Stradins University Latvian Academy of Sport Education students.

Results: European sports industry studies showed that sport and recreation employers and employees rated higher than others such inner factors as ability and willingness to learn, energy and passion, teamwork and cooperation, and communication, but Leadership were assessed as slightly less important. Exploratory factor analysis was reliable, Cronbach's Alpha of the scale being 0.90. Were revealed six factors: Self-responsibility, Social relationship, Self-awareness, Teamwork-building, Social networking and Communication skills.

Conclusions: Students considerably use social strategies, mean reported values were from 2.54 to 4.47. Females tended to use social strategies more than males, Year 4 students – more than Year 1 and Year 2 students, full-time students – more than part-time ones.

References:

1. Minten, S., Forsyth, J. (2014). The careers of sports graduates: Implications for employability strategies in higher education sports courses. *Journal of Hospitality, Leisure, Sport & Tourism Education, 15*, 94–102.
2. Khampirat, B., Rudzinska, I., & Pusaboon, K. (2024). Social skills of University Students according to Labor Market Needs: Results of a Survey. ECER 2024 Conference Cyprus, August 2024.

Burnout in Relation to Psycho-social Factors at Work and Lifestyle in Software Professionals in India

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Aim of the study: Burnout is a significant occupational health issue among software professionals due to high job demands, extended working hours, and a demanding work environment. This study aims to examine the association between burnout, workplace psychosocial factors, and lifestyle behaviors among software professionals in India.

Methods: A cross-sectional questionnaire survey was conducted among software professionals to assess job demands, job control, and social support in relation to burnout dimensions—emotional exhaustion, depersonalization, and personal accomplishment. Lifestyle behaviors, including dietary habits, smoking, and alcohol consumption, were analyzed. Pearson correlation analysis was performed to determine associations among these variables.

Results: Job demands showed a weak but significant positive correlation with emotional exhaustion ($r = .097$, $p = .024$), indicating workload-related burnout. Social support negatively correlated with emotional exhaustion ($r = –.240$, $p < .001$) and depersonalization ($r = –.117$, $p = .006$), highlighting its protective role. Job control and social support were positively linked to fast food ($r = .196$, $p < .001$) and unhealthy food consumption ($r = .180$, $p < .001$). Smoking and alcohol consumption were associated with higher depersonalization and lower personal accomplishment.

Conclusions: Burnout among software professionals is influenced by both workplace psychosocial factors and lifestyle choices. Social support helps mitigate burnout, while unhealthy dietary patterns and substance use contribute to psychological strain. Workplace wellness programs focusing on stress management, healthy eating, and reducing substance use could improve employee well-being and productivity.

The Link Between Physical Activity Motivation and Personality Traits Among Lithuanian Volunteer Soldiers

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Aim of the study: Good physical fitness is a prerequisite for the implementation of the soldiers' mission. The purpose of military physical training is to prepare, strengthen and maintain the physical fitness of soldiers in peacetime, which is necessary for military actions and operations. In order to train soldiers purposefully, it is necessary to understand the motives for their physical activity and the personality traits of soldiers. Personality traits affect the general attitude towards service, and at the same time are affected by physical activity, goals and motives. The aim of the study is to determine the correlation between the motivation of volunteer soldiers of the "X" team to do sports and personality traits.

Methods: The study was organized in 2020–2021 among volunteer soldiers. 197 Lithuanian soldiers participated. Two questionnaires were used in the study: the Motives for Physical Activity Measure-Revised (MPAM-R) was used in the study to assess the motives of military volunteers for physical activity; the "Big five" questionnaire was used to determine personality traits.

Results: It was found that the majority of volunteer soldiers are characterized by the dimension of conscientiousness, which includes such traits as reliability and honesty. The dimension of neuroticism, which is characterized by tension, nervousness, and self-pity, is least manifested among volunteer soldiers. Applying the Friedman criterion, it was found that the differences in the expression of the components of each dimension are statistically significant ($p < 0.001$). When examining the correlations between personality traits and motivation factors, we find that the more pronounced the extraversion trait, the greater the motivation to exercise for pleasure, competence, appearance and physical fitness. The more pronounced the conscientiousness trait, the greater the motivation to exercise for pleasure, competence, and physical fitness. The more pronounced the Agreeableness trait, the greater the motivation to exercise for pleasure, competence, physical fitness, and sociability. The more pronounced the neuroticism trait, the lower the motivation to exercise for competence. There are no statistically significant relationships between the openness to innovation trait and the motivation to exercise factors.

Conclusions: The most motivating motives for volunteer soldiers to be physically active are competence and pleasure motives, which belong to intrinsic motivation. The weakest motive is social, which belongs to extrinsic motivation. The most pronounced personality dimension among soldiers is conscientiousness, which includes traits such as reliability and honesty. The least pronounced dimension among soldiers is neuroticism, which is characterized by tension, nervousness, and self-pity. It was found that the more pronounced the traits of conscientiousness and sincerity, the stronger the motives of pleasure in sports and physical fitness.

The Effectiveness of Diaphragmatic Breathing in Reducing Stress Levels Among Medical Workers

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Aim of the study: This study aimed to investigate the effects of diaphragmatic breathing on perceived stress levels among medical personnel.

Methods: Twenty-four medical staff members from Health Care Center were divided into three groups: (1) Exercise and Respiratory (EV, n = 8), (2) Exercise only (V, n = 8), and (3) Control (KG, n = 8). Over eight weeks, the EV group participated in therapeutic exercise and diaphragmatic breathing sessions, the V group participated only in therapeutic exercises, and the KG group received no intervention. Stress levels were assessed using the Perceived Stress Scale (PSS), DASS-42, and physiological indicators: blood pressure, heart rate, and cortisol levels. Statistical analysis was applied to determine significance ($p < 0.05$).

Results: Pre-intervention stress levels were moderate to high across all groups, with no significant differences ($p > 0.05$). Post-intervention, the EV group showed significant reductions in stress markers: PSS scores decreased from 27.38 to 16.13 ($p = 0.001$), DASS-42 scores from 69.76 to 28.76 ($p = 0.001$), and cortisol levels from 20.80 nmol/L to 14.94 nmol/L ($p = 0.001$). Heart rate and blood pressure decreased slightly, though not always significantly. The V group showed moderate improvements, while the KG group showed minimal or no change.

Conclusions: Diaphragmatic breathing combined with therapeutic exercise significantly reduces perceived stress and cortisol levels among medical workers. These findings support the inclusion of diaphragmatic breathing in stress management programs for healthcare professionals.

References:

1. Ma, X., Yue, Z. Q., Gong, Z. Q., et al. (2017). The effect of diaphragmatic breathing on attention, negative affect and stress in healthy adults. *Frontiers in Psychology, 8*, 874. https://doi.org/10.3389/fpsyg.2017.00874
2. Perciavalle, V., Blandini, M., Fecarotta, P., et al. (2017). The role of deep breathing on stress. *Neurological Sciences, 38*(3), 451–458. https://doi.org/10.1007/s10072-016-2790-8
3. Hopper, S. I., Murray, S. L., Ferrara, L. R., & Singleton, J. K. (2019). Effectiveness of diaphragmatic breathing for reducing physiological and psychological stress in adults: A quantitative systematic review. *JBI Evidence Synthesis, 17*(9), 1855–1876. https://doi.org/10.11124/JBISRIR-D-18-00042

Attitudes of Adolescent Athletes Towards Doping

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Aim of the study: Doping use is against the spirit of sports. However, despite the awareness of athletes on the harms of doping, controls, and disciplinary consequences, antidoping violations remain a problem (1). The aim of the study is to examine the attitudes of sports students towards the use of doping in sports.

Methods: The study employed the Adolescent Sport Doping Inventory (2), which was adapted and validated in Lithuanian (1). A total of 260 physically active students participated in the survey: the respondents were divided into four age groups and two groups based on their place of residence, with boys and girls participating in the study.

Results and Conclusions: The findings indicate notable differences in attitudes towards doping among sports students based on gender, age, and place of residence. Male students are more likely than female students to consider the opinions of their social environment and others regarding doping to be important. In contrast, female students report experiencing higher levels of stress due to the pressure to perform well. Older adolescents residing in urban areas show a greater likelihood of doping use, which appears to be influenced by increased stress levels, lower confidence in anti-doping testing, and a diminished fear of potential health consequences. Conversely, younger students demonstrate a more positive attitude towards their sport, competitions, and training. Younger students report higher self-esteem compared to their older counterparts. Also, they are more accepting of the potential health risks associated with doping.

References:

1. Česnavičienė, J., Rušėnas, M., & Kviklienė, R. (2023). Adolescent attitudes towards doping and related psychosocial factors: adaptation and psychometric evaluation of lithuanian version of the adolescent sport doping inventory. *Sporto mokslas, 2* (104), 5–15.
2. Nicholls, A. R., Levy, A. R., Meir, R., Sanctuary, C., Jones, L., Baghurst, T., Thompson, M. A. & Perry, J. L. (2019). The development and validation of the Adolescent Sport Drug Inventory (ASDI) among athletes from four continents. *Psychological Assessment, 31*(11), 1279–1293.

Exercise, Sleep and Psychological Well-Being as Predictors of Body Composition in Women Participating in Exercise Program

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Aim of the study: Obesity exacerbates metabolic and musculoskeletal issues. Resistance and aerobic training improve body composition and bone health, but their effectiveness depends on lifestyle factors like sleep and psychological well-being. This study aims to evaluate the relationship between body composition, muscle strength, sleep quality, and psycho-emotional health in metabolically healthy overweight women after 12 weeks of exercise.

Methods: Thirty-five overweight women (BMI 32 ± 4.2 kg/m², age 27–58) completed a 12-week program with 150 minutes of aerobic exercise (60–70% max HR) and two weekly 45–55 min bodyweight resistance sessions. Strength was assessed via handgrip and isokinetic dynamometer tests. Body composition (BMI, weight, water, muscle, skeletal muscle, mineral mass) was evaluated using a body composition analyser (ACUNIQ), while sleep and psycho-emotional status were evaluated using Hospital Anxiety and Depression Scale (HAD) and Pittsburgh Sleep Quality Index (PSQI). Pearson's correlation and descriptive statistics were applied (SPSS).

Results: Significant reductions were observed in BMI (0.8 ± 1.7 kg/m², $p < 0.01$), weight (1.3 ± 3.8 kg, $p < 0.01$), skeletal muscle mass (0.3 ± 0.8 kg, $p < 0.01$) and mineral mass (0.1 ± 0.2 kg, $p < 0.01$) after 12 weeks of exercise. However, poor sleep, as indicated by PSQI questionnaire scores – specifically, increased sleep latency score (1.1 ± 0.9) and greater daytime dysfunction score (1.3 ± 0.7) – correlated with lower legs and hands strength (right hand: 36.5 ± 4.4 kg, left hand: 35 ± 5 kg, left leg: 4.7 ± 14 kJ, $p < 0.01$). Higher HAD score (12 ± 6) correlated with greater increases in body weight ($p < 0.01$) and lower hand grip strength ($p < 0.05$).

Conclusions: Lifestyle factors significantly influence training outcomes. Significant weight reduction occurred, but poor sleep and anxiety (higher PSQI and HAD scores) negatively affected muscle strength and bone health (mineral mass). An integrated approach, combining structured training with sleep and mental health support, is crucial for long-term musculoskeletal health and frailty prevention.

Age, Gender, and Behavioral Determinants of Body Mass Index (BMI): Insights into Physical Activity, Overeating, and Emotional Health

Majauskienė D.[1], Mockevičienė D.[2], Šarkauskienė A.[2], Predkelienė A.[1], Baranauskienė N.[1], Lisinskienė A.[1], Skurvydas A.[1]

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Aim of the study: To examine BMI variation among adults aged 18–64, focusing on physical activity structure (sedentary behavior, light, moderate, and vigorous intensity), sleep duration, emotional intelligence, perceived stress, depression, eating habits, residence (urban/rural), and harmful behaviors (smoking, alcohol).

Methods: Sample: 8 759 participants from Lithuania (6 400 women and 2 359 men).

Results: Primary predictors of body mass index (BMI) are age, gender, vigorous physical activity (VPA), overeating, sleep duration, and breakfast consumption. VPA and overeating emerged as the strongest behavioral determinants of BMI, especially with increasing age. The most significant BMI increases occurred in men aged 25–35 and women aged 45–55. In women, BMI was directly associated with perceived stress, but this was not observed in men. Emotional intelligence increases with age, while stress and depression decrease across age groups. Women engaged more in light physical activity, and men in vigorous intensity activities. A decline in MVPA and an increase in sedentary behavior were observed between the ages of 25–45. A notable increase in alcohol consumption occurred among men between the ages of 18 and 45.

Conclusions: BMI trajectories are closely linked to changes in physical activity and behavioral patterns. Targeted, age- and gender-specific interventions are needed, emphasizing vigorous physical activity, healthy eating behavior, and mental well-being. Future research should explore longitudinal and causal mechanisms underlying these associations.

Changes in The Neural Regulation of The Hamstring Muscle Group Caused by Spinal Reflector Irritation

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Aim of the study: To investigate the effect of spinal reflex stimulation on the neural regulation of the hamstring muscle group.

Methods: The study enrolled 38 participants. Persons aged 18 to 25 years. Inclusion criteria: at least Class I classification, caffeine abstinence for at least one hour before testing, and strenuous physical activity abstinence for 24 hours. Exclusion criteria: back and lower musculoskeletal injuries, current low back, hamstring and knee pathologies, low back and hamstring surgeries, contraindications to spinal mobilizations.

Results and Conclusions: Applying spinal reflex stimulation, the maximum static strength and range of motion of the hamstring muscle group improved and is statistically significant ($\alpha \leq 0.05$).

The Role of Physical Activities in Horse Assisted Language Learning

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Aim of the study: This study aims at exploring the role of physical activities in horse assisted language learning, using the methodology of Horse Powered Reading for teaching language and reading.

Methods: The methods include exploring the guidelines for Horse Powered Reading and analysing which of the proposed tasks for teaching language and communication skills have a strong presence of physical elements.

Results: The findings show that the methodology is equally divided between indoor and outdoor activities, with 100% of outdoor tasks involving movement (standing, walking, running, picking up and lifting objects, kicking or dribbling the ball, etc.), while only 60% of indoor activities involve movement, the other activities being sedentary.

Conclusions: It can be concluded that physical activities are essential for horse assisted language learning and are extensively present in the learning curriculum.

References:

1. Methodological materials for horse powered reading(r) modules, from horsepoweredreading.com
2. Stoppard, L., & Donaldson, J., (2024). Evaluation of equine assisted learning in education for primary school children: a qualitative study of the perspectives of teachers. *Front. Educ. 9*:1275280. https://doi.org/10.3389/feduc.2024.1275280
3. Frederick, K., Hatz, J., Lanning, B. (2015/02/20). Not Just Horsing Around: The Impact of Equine-Assisted Learning on Levels of Hope and Depression in At-Risk Adolescents. *Community mental health journal*. https://doi.org/10.1007/s10597-015-9836-x
4. Gehtmane-Hofmane, I. (2018). Equine Assisted Learning: Symbolic Value of Horse as Underlying Pattern in Human Thinking. Society. Integration. Education. *Proceedings of the International Scientific Conference*, Volume V, May 25–26, 81–86.

Emotional and Physical Outcomes of a Walking Program in Lithuanian Adults with Chronic Illnesses

Skurvydas A.[1], Musvydaitė-Vilčiauskė V.[2], Visinskis V.[2], Majauskienė D.[1]

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Aim of the study: The objective of the study was to assess how this behavioral change affected body weight, emotional well-being, and self-rated health.

Methods: This six-month intervention study involved 1,051 Lithuanian adults aged 20 to 75 (697 women and 354 men) living with various chronic health conditions, such as obesity, prediabetes, and lipodystrophy. Participants took part in a lifestyle program aimed at gradually increasing daily physical activity, primarily through walking.

Results: At the start of the study, the average daily step count was 6,391 ± 2,814 steps for women and 7,143 ± 3,294 steps for men. Over the course of the intervention, these averages increased to 6,833 ± 3,063 steps for women and 7,523 ± 3,354 steps for men. Throughout the intervention, the average number of daily steps increased significantly by 6.9% in women ($p = 0.000$, Cohen's $d = 0.48$) and 5.3% in men ($p = 0.000$, $d = 0.41$). Body weight decreased modestly but significantly in both groups: women lost an average of 0.33 kg ($p = 0.009$, $d = –0.15$), while men lost 0.63 kg ($p = 0.004$, $d = –0.23$). These weight reductions were achieved without structured dietary interventions, highlighting the potential impact of moderate physical activity alone. In terms of psychological and subjective health outcomes, women demonstrated the most consistent and significant improvements. Well-being scores increased from 7.39 to 7.93 ($p < 0.001$, $d = 0.31$). Significant enhancements were also observed in motivation, energy, happiness, and perceived health ($p < 0.05$, $d = 0.15–0.46$), while stress and anxiety levels decreased ($p < 0.01$, $d = –0.22$ to $–0.29$). Men also experienced positive changes, though to a lesser extent; their well-being scores increased from 7.92 to 8.15, but this change was not statistically significant ($p = 0.157$, $d = 0.14$). Nonetheless, significant improvements were noted in energy, happiness, perceived health, and stress reduction ($p < 0.05$, $d = 0.20–0.27$).

Conclusions: In conclusion, among Lithuanian adults with chronic conditions, a modest but sustained increase in daily walking over six months resulted in meaningful improvements in emotional well-being, energy, and perceived health, particularly among women. These findings highlight the effectiveness of simple, accessible physical activities as a public health tool for enhancing both mental and physical well-being across a broad adult population.

Young Dancers' Attitudes Towards Developing Creativity in Dance Sport Training

Ušpurienė A. B.

Vytautas Magnus University, Kaunas, Lithuania

Aim of the study: The aim of the study was to investigate the attitudes of young dancers towards creativity development in dance sport.

Methods: literature review, semi-structured interview, reflection.

Results: The results of the study showed that fostering creativity in the teaching of dance sport is very important. It can be said that the development of creativity in young dancers was perceived as a long-term and dynamic process. The main methods presented by the dancers were: a series of dance classes on the theme of creativity, creative tasks, celebrations, events, competitions. It is also very important for the dancers to emphasise the need for continuous creation and experimentation, as creativity is not only the ability to create, but also a process that is combined with continuous improvement and openness to new ideas. Teachers also need to encourage and support their students in order for continuous growth to take place. Long-term goals need to be set and students need to be constantly inspired and given many examples to inspire them. Creativity development in dance classes was seen as very important because it helps students to realise that creativity is a process that is ongoing and requires effort and openness to new ideas.

Conclusions: Methods of fostering creativity used by teachers in dance sport classes include creating a safe environment, giving freedom to experiment, encouraging students' personal uniqueness and providing opportunities to create and interpret dance moves, and often taking students to dance competitions. It is essential to provide a variety of creative tasks, workshops and to keep dancers motivated to create and experiment.

Changes in Health-Related Physical Fitness of Estonian High School Students Over Three Years: Preliminary Analysis

Vaher K., Pihu M., Mäestu E.

University of Tartu, Tartu, Estonia

Aim of the study: Cardiorespiratory fitness (CRF) and muscular strength have shown the strongest and most consistent associations with health-related outcomes. Therefore, assessing physical abilities throughout high school would provide important information about the current state and which abilities require more attention in the future. This study aims to measure health-related physical fitness in Estonian high school students over three years (from 10th to 12th grade) and to compare the results with Fitback health-related norms.

Methods: Students (aged 15–19 years) from seven Estonian high schools participated. In the first year, a total of 537 students participated (292 female, 245 male); in the second year, 491 students (277 female, 214 male); and in the third year, 402 students (198 female, 204 male). For CRF, a 20-m shuttle run was performed, for muscular strength, standing long jump (in cm) and handgrip strength (in kg) were measured. All individual results were compared to Fitback health-related norms.

Results: Male students showed significantly higher handgrip strength in Grades 11 and 12 ($p < 0.005$) and better long jump results in Grade 11 ($p = 0.039$) compared to Grade 10. Female students performed significantly better in the 20m shuttle run in Grades 11 and 12 than in Grade 10 ($p \leq 0.015$). The best results were in the standing long jump, with 57–67% of students in the healthy zone. The worst results were in the 20m shuttle run, with 42–60% in the healthy zone and 18–30% in the poor health zone.

Conclusions: While standing long jump results show that 57–67% of students are in the healthy zone, endurance tests reveal that 18–30% of Estonian high school students have poor levels of physical abilities. To prevent health risks, their physical fitness levels need significant improvement.

April 30, 2025
11.30–13.00

SCIENTIFIC SESSION III: Oral presentations

Section 1: Sports coaching and performance
Room: Conference Hall "GAMA"

Changes in Anaerobic Capacity of Roller Skiers After Two Week Dynamic High Intensity Interval Training

Jakovics M., Pontaga I.

Riga Stradiņš University, Riga, Latvia

Aim of the study: 1) Compare the characteristics of aerobic capacity before and after dynamic intervals of "2 × to 10" and the ability of the subjects to maintain work capacity indicators. 2) Discover potential efficiency in exercise dosing using the subject's ability to maintain constant power as a criterion. 3) Develop recommendations for coaches regarding the selection of training protocol.

Methods: Anthropometry, Ergometry Gas exchange analysis, Pulsometry, Mathematical statistics. Participants: Cross-country skiers, four females in the study (age in years: 18 ± 2; VO_2max ml/kg/min: 51.2 ± 2.2, weight in kg: 63.18 ± 3.58), six male participants in this study (age in years: 17 ± 1.67; VO_2max ml/kg/min: 58.57 ± 2.81, weight in kg: 74.76 ± 3.63) Interval protocol: For two weeks, the participant performs interval training according to the protocol "2x up to 10 min" with rest ratio of 1 : 2. In this mode, training is carried out for 2 weeks, 3 times a week.

Results: A statistically significant weight loss of an average of 0.5375 kg was observed after two weeks of dynamic high-intensity interval training ($p = 0.01633$). A significant improvement ($p = 0.01955$) was observed in work capacity at the VO_2max level after two weeks of training. The average increase was 1.375 km/h, the highest 4.4 km/h and the lowest 0.5 km/h. No participant's performance deteriorated over the two weeks. Even comparing the length of the first and final, sixth intervals, a significant increase was observed ($p = 0.0315$).

Conclusions: Dynamic HIIT protocol "2x up to 10min" could be an effective way for tapering before mayor event. It also increases the athletes work capacity at VO_2max.

Acknowledgements: In association with the project "RSU internal and RSU with LSPA external consolidation", No. 5.2.1.1.i.0/2/24/I/CFLA/005

The Effects of Small-Sided Games, Skills Development and Plyometric Training Protocols on the Physical Performance of Youth Male Basketball Players

Kamarauskas P., Paulauskas R.

Vytautas Magnus University, Kaunas, Lithuania

Aim of the study: This study aimed to assess the effect of three basketball specific training protocols on changes in physical performance of youth basketball players.

Methods: Thirty-eight youth male basketball players (age: 13.9 ± 0.5 y.o.; height: 172.9 ± 9.3 cm.; body mass 57.0 ± 10.9 kg; wingspan: 174.5 ± 10.5 cm.), participated in this study and were assigned to four different groups: small-sided games (SSG), skills development (SKILLS), plyometric training (PLYO), and control group. During an 8-week experimental training period, players followed their regular training schedule with inclusion of 2 weekly experimental training sessions for SSG, SKILSS and PLYO groups. Before and after experimental period, participants completed physical assessment testing procedures and were monitored during a simulated 5x5 basketball matches using VXSport inertial movement devices.

Results: Linear-mixed model analysis showed that different training protocols have a different effect on basketball specific movement speed ($p < 0.001$), maximal oxygen uptake ($p < 0.001$), distance covered ($p < 0.001$), and total jumps completed during a simulated match ($p = 0.032$). Post-hoc analysis showed that SKILLS and PLYO significantly improved basketball specific movement speed ($p < 0.05$), PLYO significantly increased distance covered during a simulated match ($p < 0.001$), with no other post-hoc effects found. No effect of applied protocols was found for the assessment of 5-m and 20-m sprint, countermovement jump, drop-jump height and contact time ($p > 0.05$). Moreover, no effect was found for maximum running speed, number of sprints, accelerations and decelerations measured in simulated matches from pre-to-post experimental period ($p > 0.05$).

Conclusions: This study showed that three different basketball specific training protocols have distinctive effect on physical performance in youth male basketball players.

Competencies and Qualifications of Boxing Coach

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[2] Riga Stradiņš University, Riga, Latvia
[3] Wroclaw University of Health and Sport Science, Wroclaw, Poland

Aim of the study: Modern training is a complex process, and its effectiveness is influenced by many factors. The concept of competence has appeared in various polemics for many years in the aspect of what a modern combat sports trainer should be like. Usually, in sports, trainers are secondary characters, but it is thanks to them that competitors break world records and win gold medals at the Olympic Games. The aim of the research was to obtain knowledge about selected competences and qualifications of boxing (trainers) coach.

Methods: The study was conducted on 50 person who have been combat sport trainers for at least 5 years.

Results and Conclusion: Specially designed interview questionnaire "Professional competences and qualifications of trainers in selected sports and physical recreation disciplines" was used to examine professional competences. It should be emphasized that access to coaches of the national team is limited. The research revealed that the boxing coaches surveyed showed high competencies in all areas of professional tasks studied. On the other hand, in the area of innovation and enrichment of the training plan with new but diverse both general and special exercises, they showed higher competencies than coaches of team games.

Relationships Between Aerobic Performance Parameters and Internal Training Load During A 60-Min Aerobic Threshold Intensity in Young Cross-Country Skiers

Mäestu J., Rauno K., Kirte-Katrin S., Priit P.

University of Tartu, Tartu, Estonia

Aim of the study: To investigate changes in rating of perceived exertion (RPE) during a 60-minute constant load test in double-poling on ski ergometer and its relationship with aerobic performance parameters in young Estonian skiers.

Methods: 10 cross-country skiers in ages 15.9 ± 0.7 performed maximal incremental test and 60-minute constant-load test on double-poling ski ergometer at least 48 hours apart. During the incremental test, heart rate (HR) and rating of perceived exertion were measured every minute and maximal oxygen uptake and corresponding power in watts were determined. The 60-minute constant load test was performed according to the aerobic threshold power determined in the first test. RPE, heart rate and fatigue level were measured after every 10 minutes.

Results: HR changed significantly from 40 minutes onward during the 60-minute test, while RPE increased significantly already from 20 min ($p < 0.05$). Aerobic threshold performance (W) was significantly related to changes in fatigue and changes in RPE ($r = 0,674$ and $r = 0,736$, respectively). Expected internal load was significantly lower compared to actual internal load (192 ± 97 vs 306 ± 77 AU, respectively).

Conclusions: The increase in RPE leads to higher internal load than expected and the change is reflected of the aerobic threshold performance.

Verbal Feedback and the Effectiveness of Learning the Forward Roll

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Józef Piłsudski University of Physical Education, Warsaw, Poland

Aim of the study: The aim of this study was to determine the impact of different types of verbal feedback on the effectiveness of learning the forward roll in children aged 6 to 8 years.

Methods: Thirty-one children (n = 31), aged 6–8, participated in the study. An experimental design and expert evaluation were employed as research methods. Participants were randomly assigned to two groups: Group E received verbal feedback focused on errors related to overall motor skill performance (descriptive feedback), while Group C received verbal feedback on how to correct the errors (prescriptive feedback). The technique was evaluated at three time points: pre-test, post-test, and retention test. The criteria from the FUS test (Fundamental Motor Skills in Sport) were used to assess the forward roll technique, scored on a scale from 0 to 5 points.

Results: In the pre-test, no significant differences were found between the groups ($p > .05$). In the post-test, Group C obtained significantly higher mean scores than Group E ($p < .05$). In the retention test, Group C continued to show higher mean scores ($p > .05$), but Group E demonstrated a greater mean improvement from pre-test to retention test ($p < .05$).

Conclusions: The effectiveness of learning the forward roll in children aged 6–8 depends on the type of verbal feedback provided. Prescriptive feedback appears to be more effective for initial motor learning, while descriptive feedback may contribute to more durable learning outcomes by enhancing understanding of the overall motor learning process.

Effects of Different Interval Durations on Training Load and Post-Exercise Recovery in 3×3 Basketball

Paulauskas R. [1], Kamarauskas P. [1], Figueira B. [2]

[1] Vytautas Magnus University, Kaunas, Lithuania
[2] University of Evora, Evora, Portugal

Aim of the study: The aims of this study were (I) to measure external and internal training loads during 1-, 2-, 3-, and 4-min simulated 3x3 basketball games, with 1-min recovery periods following each game and (II) to evaluate the recovery rates of heart rate and the muscle oxygen saturation following 1-, 2-, 3-, and 4-min play.

Methods: Twelve (n = 12) elite male 3×3 basketball players (age: 26.6 ± 5.6 years; height: 196.8 ± 5.5 cm; body mass: 92.0 ± 9.5 kg; training experience: 15.4 ± 3.9 years; and 3×3 basketball training experience: 4.8 ± 1.6 years) representing Lithuania national team were recruited and asked to perform two controlled simulated matches. External load volume was quantified by total distance (m), number of sprints and jump count. As for external load intensity, distance rate (m/min), average speed (km/h), maximal speed (km/h), jump rate (jumps/min), average height jump zone total (cm), heart rate (bpm) and muscle oxygen saturation (%) were evaluated.

Results: A repeated-measures factorial analysis of variance was used to compare differences in performance between intervals. Overall, the results showed that using different play-time scenarios substantially impacted training load and physiological recovery, with significant differences in the majority of parameters.

Conclusions: These findings provide insight into potential interventional implications and advancement of training protocols for 3×3 basketball, highlighting the importance of post-exercise recovery protocols that are tailored to the specific playing duration.

The Effect of Physical Load on Choice Reaction Time in Combat Sport Athletes

Teteris L. E., Saulīte S., Līcis R.

Riga Stradiņš University, Riga, Latvia

Aim of the study: Combat sport is a contact sport that usually involves one-on-one combat. The physical demands of combat sports include them among the most challenging sports, as athletes are required a high level of different physiological responses. Visual reaction time is considered one of the most important elements of combat sport. Previous studies on the effects of physical load on reaction time have concluded that reaction time becomes worse with increasing physical load and that exercise-induced fatigue only prolongs simple reaction time and does not affect the decision-making processes of elite-level athletes. The aim of this study was to determine the choice reaction time of combat athletes at physical loads of different intensities.

Methods: The study included a total of 15 participants, 13 men and 2 women aged 16–24 years, with an average weight of 68 kg for men and 62 kg for women, and an average height of 180 cm for men and 167 cm for women. The choice reaction time was determined using Vienna tests. Using a Wattbike trainer, each subject's pedalling speed was monitored to ensure it was appropriate for each heart rate zone from zone 1 to zone 5, performing a Vienna choice reaction time test. A gas analyser was also used to determine the relationship of the maximal oxygen consumption rate achievable during physical load (VO_2max) with the choice reaction time during physical load.

Results and Conclusions: The results of this study showed that induced fatigue had a positive, rather than negative, effect on decision making and choice reaction time in combat athletes. There is no statistically significant association of choice reaction time with VO2max, but for zone 5 reaction there is a tendency for participants with higher VO_2max to have lower reaction times, $r(11) = –0.497$, $p = 0.060$.

April 30, 2025
11.30-13.00

SCIENTIFIC SESSION III: Oral presentations

Section 2: Physical activity, recreation, and health
Room: Conference Hall "DELTA"

The Effects of Recreational Activities on Teachers' Well-being and Mood: A Case Study

Liepina I., Smuka I., Muizniece U. S.

Riga Stradiņš University, Riga, Latvia

Aim of the study: This study aimed to explore the impact of recreational activities on teacher well-being and mood throughout the academic year by organizing a walking tour of the UNESCO-listed Old Town of Riga.

Methods: A walking route featuring 17 cultural landmarks was created, inspired by the children's book "Rīgā, kādu nakti (One Night in Riga/Juris Zvirgzdins)." The activity took place as a photo-orienteering tour. Twelve full-time teachers (n = 12) participated, all of whom worked with primary or secondary students. Their emotional states were assessed before and after the activity using the SAN scale (Well-being-Activity-Mood) by Doskien et al (1973), which evaluates self-perceived emotional well-being across 30 bipolar item pairs, scored from 0 to 3 where 0 – corresponds to an unexpressed/neutral feeling (does not correspond to any of the poles) and 3 – fully characterizes the feeling at the moment. The first 10 questions assess the state of well-being, the next 10 questions evaluate activity, and the last 10 questions evaluate the current mood. The mean (M) scores for well-being, activity, and mood were calculated for both time points.

Results: Before the activity, the mean score for well-being was M = 3.4, indicating a low emotional state. After the intervention, 88.96% of participants scored above M = 6.0, reflecting a significant improvement in their psycho-emotional condition.

Conclusions: The results indicate that recreational walking activities significantly enhance teachers' well-being and mood. Incorporating low-threshold, nature- or culture-based physical activities into the school year can effectively support educators' mental health.

Preliminary Results on the Satisfaction of Physical Activity Opportunities in Schools Among 4th-Grade Students: A Comparison Between Schools in Motion (SiM) and Non-Network Schools

Mäestu E., Uibu M., Mägi K., Kalma M., Kull M.

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Aim of the study: Comprehensive physical activity (PA) programs implemented in schools advocate for a holistic strategy to enhance PA within educational settings. The SiM program in Estonia is a nationwide initiative designed to improve PA levels among schoolchildren, thereby improving their health and academic performance. Regular national surveys offer the chance to evaluate the long-term effects of these intervention programs; thus, the study aimed to present a longitudinal analysis of 4th-grade students' perceptions of PA opportunities in Estonian schools.

Methods: Data were gathered from the National School Satisfaction Survey conducted between 2018 and 2024. On a 5-point Likert scale, 4th graders (n = 77,677, 50.1% girls) assessed their satisfaction with opportunities for PA during recess (both indoors and outdoors), breaks from sitting during academic lessons, motivation from teachers to engage in PA, and the arrangement of recess activities by students. The change in satisfaction regarding school PA opportunities was evaluated by the proportion of students who reported being satisfied or very satisfied.

Results: A greater percentage of 4th-grade students in SiM schools expressed satisfaction with the overall school PA opportunities compared to their counterparts in non-network schools ($p < 0.001$). When examining each individual statement, it is evident that in nearly every year of the survey, students in SiM schools exhibited higher satisfaction levels than those not in network schools ($p \leq 0.025$).

Conclusions: A comprehensive school-based intervention program in Estonia has enhanced the satisfaction levels of 4th-grade students regarding PA opportunities during the school day. School-based intervention programs increasing PA can be effective, but continuous monitoring and evaluation of these processes is necessary.

Sarcopenia Screening in Parkinson's Disease

Medijainen K., Mäestu E.

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Aim of the study: Parkinson's disease (PD) and sarcopenia are two prevalent conditions among the aging population. Early assessment of sarcopenia in individuals with PD is essential to help prevent falls and disability. Therefore, this study aimed to determine the prevalence of sarcopenia according to both functional criteria and dual-energy x-ray absorptiometry (DXA).

Methods: A cross-sectional study included 20 individuals with PD (10 men, 10 women; mean age 71.9 ± 6.2 years). Sarcopenia was assessed using the European Working Group on Sarcopenia in Older People 2 (EWGSOP2) criteria, incorporating handgrip strength, and physical performance (Timed-Up-and-Go Test (TUG), Short Physical Performance Battery (SPPB)). Body composition (including the sarcopenia index and T-score) was assessed via dual-energy x-ray absorptiometry (DXA). PD severity was evaluated using the MDS-UPDRS and Hoehn & Yahr scale.

Results: DXA confirmed sarcopenia in only one male and one female participant. Functionally, one male and two females met all EWGSOP2 sarcopenia criteria; however, their sarcopenia index obtained via DXA remained above the diagnostic threshold. Men demonstrated significantly better body composition, handgrip strength, and SPPB performance (total score and sit-to-stand) compared to women ($p < 0.05$). No sex differences were observed in gait speed (TUG and SPPB), PD severity, or T-scores.

Conclusion: Sarcopenia prevalence was low (10%) in both sexes; however, functional indicators of sarcopenia were more frequent in females. The EWGSOP2 criteria did not consistently identify sarcopenia as confirmed by DXA. These findings underscore the need to consider PD-specific diagnostic criteria for sarcopenia screening.

The Interaction Between Subjective Health and the '5' Lifestyle Factors: Whole-Body Heating, Material and Spiritual Happiness, Physical Activity and Cognitive Functioning: Preliminary Data from the Government-Funded Project THERMOHORMESIS

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Aim of the study: to investigate the interaction between subjective health and the '5' lifestyle factors: whole-body heating, material and spiritual happiness, physical activity and cognitive functioning.

Methods: A total of 710 individuals (of which 558 self-identified as female and 152 as male) aged 18 to 64 years participated in the online survey of a representative sample of Lithuanian adults. The participants were enrolled in this cross-sectional survey, which was conducted as part of the THERMOHORMESIS project, using a snowball sampling method. An online questionnaire was shared through popular social networks and emails within the period October 2024 to February 2025. Individual characteristics, sauna-related habits and subjective health and well-being were assessed using the modified Sauna questionnaire (Hussain et al., 2019). Descriptive analysis, a two-way analysis of variance, and linear regression analysis were used to interpret the data.

Results: The survey results showed a significant positive correlation between women and men subjective health and material happiness (with $\beta = 0.554$ and p-value = 0.0), number of steps per day ($\beta = 0.239$, p-value = 0.0) and negative correlation between subjective health and body mass index ($\beta = –0.285$, p-value = 0.0).

Conclusions: These preliminary findings highlight that of all five lifestyle factors studied, material happiness and physical activity are the most important determinants of subjective health for Lithuanian women and men of different ages.

References:

1. Hussain, J. N., Greaves, R. F., & Cohen, M. M. (2019). A hot topic for health: Results of the Global Sauna Survey. *Complementary therapies in medicine, 44*, 223–234. https://doi.org/10.1016/j.ctim.2019.03.01

Synergy Between Movement and Ideas: How Physical Activity Develops Creative Thinking

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Aim of the study: In today's society, dominated by technology and passive leisure, young people's physical activity is declining, and the creative competences needed for personal and professional development are also weakening. However, traditional education systems often separate physical activity from creative education, failing to appreciate the interconnectedness and synergy between the two. It is therefore important to find methods and strategies to deliberately integrate creative practices into the physical education process in order to fully develop the younger generation. The aim of this article is to discuss physical activity methods that promote creativity in leisure activities among young people. The focus on young people is particularly relevant as this is a critical period for both physical and cognitive development, with potentially long-lasting implications for adult creativity and problem-solving skills. The problem of research: what are methods to promote creativity in young people through physical activity?

Methods: Systematic literature analysis and ecological dynamical system theory. The process of a systematic literature review involves several key stages: Search, Assessment, Synthesis and Analysis (SALSA). The literature search was conducted in major scientific databases (SCOPUS, EBSCO Publishing, ScienceDirect, Taylor & Francis Journals; Springer Journals, SAGE journals), with a priority on open access sources. The work is based on ecological dynamical system theory and the principles of non-linear pedagogy, as it emphasises the power of physical activity actions to promote creativity in young people. Understanding that physical activity, when properly maintained, has a positive impact on a young person's later life: improving creative abilities, decision-making, emotional well-being, and psychological health balance.

Conclusions: Physical activity helps young people enhance memory, imagination, and motivation to create, while fostering creative problem-solving, communication, and cooperation. These skills are key to realizing personal potential, self-expression, and confidence.

References:

1. Araújo, D., Davids, K., & Renshaw, I. (2020). Cognition, emotion and action in sport: An ecological dynamics perspective. *Handbook of sport psychology*, 535–555.
2. Piya-Amornphan, N., Santiworakul, A., Cetthakrikul, S., & Srirug, P. (2020). Physical activity and creativity of children and youths. *BMC pediatrics, 20*, 1–7.
3. Pill, S. (2014). Informing game sense pedagogy with constraints led theory for coaching in Australian football. *Sports Coaching Review, 3*(1), 46–62.

April 30, 2025
11.30–13.00

SCIENTIFIC SESSION III: Oral presentations

Section 3: Sports psychology and physical education
Room: Conference Hall "ZETA"

Effect of Bandwidth Knowledge of Performance in Gymnastics Routine

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Aim of the study: This study aimed to evaluate the effectiveness of verbal feedback in the acquisition of the straight forward somersault after a forward swing.

Methods: The research sample included 16 female gymnasts, randomly assigned to two groups: the BFKE group (n = 8), which received bandwidth feedback focused on key elements of the skill , and the FAE group (n = 8), which received comprehensive feedback on all identified errors within the movement structure.

Results: The findings indicated that the skill could be divided into preparatory, main, and final phases, each with identifiable key elements. A mixed ANOVA revealed statistically significant differences ($p < 0.05$) between the groups over time, with the FKE group demonstrating superior performance in executing the routine. Additionally, the Welch t-test for independent samples confirmed that the FKE group achieved significantly higher scores from judges at the final assessment.

Conclusions: These results suggest that targeted feedback addressing critical errors is more effective than exhaustive feedback on all mistakes. The study highlights the importance of strategically applied feedback in enhancing motor skill learning and suggests that a focus on key technical components may lead to better training outcomes. Further investigations are recommended to explore the role of such feedback in mastering complex motor tasks in elite-level athletes.

Determinants of Participation and Non-Participation in Physical Education Classes of High School Students

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Aim of the study: The aim of this research is to understand the opinions of high school students in Biała Podlaska regarding physical education classes. Additionally, the study seeks to assess how well these classes meet students' expectations and whether they encourage physical activity during their free time.

Methods: The study employed a diagnostic survey method utilizing a questionnaire consisting of 23 questions.

Results: The findings revealed that only 32% of students regularly participate in physical education classes. For 36% of them, the most common reason for not attending these classes is a lack of desire and motivation. Furthermore, 73% of students rated the conditions for physical activity in their school as good or very good. Additionally, 85% of students engage in physical activity during their free time.

Conclusions: Students highlighted the limited variety of physical activities offered during physical education classes. Improving students' self-esteem regarding their physical fitness may contribute to a more positive attitude towards physical education classes and voluntary participation in them. A key area that requires support is the psychological aspect of enhancing motivation. There is a need to diagnose the physical activity needs of young people to better tailor the program to the most active students as well as those who engage less frequently in exercise. It is also worth considering adapting the program to accommodate individuals with various health limitations.

References:

1. Henriques-Neto, D., Peralta, M., Garradas, S., Pelegrini, A., Pinto, A. A., Sánchez-Miguel, P. A., & Marques, A. (2020). Active commuting and physical fitness: A systematic review. International *Journal of Environmental Research and Public Health, 17*(8), 2721; https://doi.org/10.3390/ijerph17082721
2. Smuka, I. (2018). Youth physical activity as an out-of-class occupation. *Polish Journal Sport and Tourism, 25*, 42–45; https://doi.org/10.2478/pjst-2018-0019
3. Zembura, P., Korcz, A., Nałęcz, H., & Cieśla, E. (2022). Results from Poland's 2022 report card on physical activity for children and youth. *International Journal of Environmental Research and Public Health, 19*(7), 4276; https://doi.org/10.3390/ijerph19074276

Sleep and Well-Being Across the Lifespan through Educational Insights into Psychological and Lifestyle Factors

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Aim of the study: Sleep plays a vital role in health and functioning, yet the relative contribution of psychological and lifestyle factors remains unclear. This study aimed to identify the most significant predictors of sleep parameters – duration, latency, bedtime, and wake-up time – considering gender, age, mood, personality, physical activity, and cognitive-emotional traits.

Methods: A cross-sectional study was conducted with 1,140 adults (831 women, 309 men) aged 18–65+, who completed validated questionnaires assessing sleep patterns, mood (BRUMS), perceived stress, emotional intelligence, logic, empathy, Big Five personality traits, physical activity (MVPA), and BMI.

Results: Higher perceived stress was consistently associated with poorer sleep outcomes: longer latency, shorter duration, and later bedtimes ($p < 0.01$). Leisure-time MVPA predicted later bedtimes, whereas occupational MVPA and higher BMI were linked to shorter sleep duration ($p < 0.05$). Gender and age differences emerged: women reported more stress, emotional fatigue, and empathy ($p < 0.001$), while men showed higher vigor, self-rated health, and independent exercise. Older adults slept less and woke earlier ($p < 0.001$). Personality traits significantly contributed: neuroticism predicted longer latency and shorter duration, agreeableness was linked to better sleep quality, and conscientiousness to earlier wake-up times. In contrast, cognitive traits—logic, emotional intelligence, and empathy – were not significant predictors of sleep.

Conclusions: These findings suggest that sleep is more strongly shaped by stress, physical activity context, mood states, BMI, and personality than by cognitive-emotional capacities. Personalized interventions targeting stress regulation, lifestyle balance, and emotional well-being may be key for improving sleep, particularly in aging and high-stress populations.

References:

1. Ben Simon, E., Vallat, R., Barnes, C. M., & Walker, M. P. (2020). *Trends Cogn Sci, 24*(6), 435–450. https://doi.org/10.1016/j.tics.2020.02.003
2. Kredlow, M. A. et al. (2015). *J Behav Med, 38*(3), 427–449. https://doi.org/10.1007/s10865-015-9617-6
3. Skurvydas, A. et al. (2024). *BMC Public Health, 24*(1), 546. https://doi.org/10.1186/s12889-024-17806-5

The Academic Achievement and Self-Esteem of 15-16 Years Old Students of Tartu According to their Participation in Organized Sports and Daily Physical Activity

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Aim of the study: The aim of study was to assess the physical activity, daily screen time, academic achievement and self-esteem in basic school students according their participation in organized sports and find the associations between measured indices.

Methods: Sixty 9th grade students (28 boys, 32 girls, mean age 15,2 years) from 10 basic schools of Tartu agreed to participate in current study whereas 100 students were invited. Physical activity was measured by accelerometers, self-esteem was assessed using RSES-C questionnary and the depression score from EEK-2 questionnary was used. Students were asked to report about their participation in sports, screen time on schooldays and school achievement in estonian language and mathematics.

Results: Forty six students were engaged in organized sports (335 +– 217 min/week). The mean time spent in moderate-to-vigorous physical activity (MVPA)was 51 +– 21 min/day, whereas 16 participants met the daily normative of 60 min MVPA daily. The students engaged in sports had lower daily screen time on schooldays (256+– 78 min/day vs 340 +– 133 min/day), higher MVPA level (54 +– 21 vs 35 +– 8 min/day) and higher mark in mathematics (4,5 +– 0,7 vs 4,0 +– 0,8) as compared to non-sportsmen. The self-esteem level and depression score were not different in neither groups.

Conclusions: The participants of organized sports had better results in mathematics and spent less time in screen activities on schooldays. The level of physical activity and self-esteem were not associated in our study sample.

Innovative Technologies in Sports Education: Self-Regulation of Physical Activity Intensity in 10-13-Year-Old Children

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Aim of the study: The aim was to investigate the intensity of physical activity of 10–13 year old children when smart technologies are used for its regulation.

Methods: Data were collected during the "Move and Know" project (NR. SRF-FAV-2022-1-0096) in the 2022–2023 academic year. Nine groups of children aged between 10 to 13 years (M = 11.4 ± 0.80 years) from Klaipeda city public schools participated in the project. Their participation in activities varied from 2 to 4 times. In total, the data of 524 children (249 girls, 275 boys) were analysed. Pulsometers (Polar Pacer) and system Polar Team were used to objectively collect Heart Rate (HR) data.

Results: The average duration of the activities was 59.11 ± 5.30 minutes. The mean HR was 136.01 ± 15.21 bpm, with a maximum HR of 175.30 ± 17.34 bpm. Analysis of load distribution by intensity zones revealed that most of the time was spent in Zone 1 (35.19 ± 23.21 minutes), Zone 2 (32.18 ± 13.45 minutes), and Zone 3 (23.01 ± 14.40 minutes). Zones 4 and 5, representing vigorous intensity physical activity, had shorter durations. Physical activity intensity in children reached Zone 4 for 15.45 ± 12.62 minutes and Zone 5 for 5.58 ± 6.63 minutes.

Conclusions: The intensity of the activities met the recommended guidelines, with more than 50% of physical activity being of moderate to vigorous intensity. These findings suggest that physical education sessions, incorporating innovative technologies, significantly contributes to achieving the recommended intensity levels of physical activity for children.

The Role of Physical Education Teachers (De-)Motivational Styles on Students' Physical Activity in Leisure Time

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University of Tartu, Tartu, Estonia

Aim of the study: The aim of this research was to examine the relations of the eight perceived teaching styles (i.e., participative, attuning, guiding, clarifying, demanding, domineering, abandoning and awaiting; Aelterman et al., 2019) of physical education (PE) teachers with students' self-reported physical activity (PA) in leisure time (LT), mediated by satisfaction and frustration of basic psychological needs in PE, and autonomous and controlled forms of motivation in PE and LT.

Methods: 239 students (91 boys, 144 girls and 4 of gender unidentified) aged from 11 to 14 years old (M = 12.43, SD = 0.57) filled in the web-based questionnaire of study variables. A path-analytic model was employed to test the model.

Results: The model demonstrated good fit with the data: $\chi 2=107.34$, df = 48, p <. 0001; CFI = .97; NNFI = .97; RMSEA = .07). Two specific pathways were identified: from perceived attuning style to self-reported PA in LT, mediated by autonomous motivation in PE and LT ($\beta = .11$, $p < .0001$), and (2) from perceived awaiting style to self-reported PA in LT, mediated by autonomous motivation in PE and LT ($\beta = .06$, $p < .001$).

Conclusions: When a PE teacher employs an attuning style (e.g., providing choices, allowing own pace) and awaiting teaching style (e.g., students take the initiative, while the teacher adapts as the lesson unfolds), it is likely to satisfy students' basic psychological needs and increase autonomous motivation towards in PE and LT, which, in turn, may enhance adolescents' PA during LT.

References:

1. Aelterman, N., Vansteenkiste, M., Haerens, L., Soenens, B., Fontaine, J. R. J., & Reeve, J. (2019). Toward an integrative and fine-grained insight in motivating and demotivating teaching styles: The merits of a circumplex approach. *Journal of Educational Psychology, 111*(3), 497–521. https://doi.org/10.1037/edu0000293

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ABSTRACT BOOK

Authors assume full responsibility for the correctness of their abstract's language

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